《語言暨語言學》專書系列之六十五

中央研究院語言學研究所
成所二十週年慶祝論文集

曾淑娟 齊莉莎
編輯

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Linguistic Diversity, but Unity in Research: Celebrating the Twentieth Anniversary of the Institute of Linguistics, Academia Sinica

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Preface

The present volume has been especially edited to celebrate the vigentennial anniversary of the Institute of Linguistics (ILAS) (2004–2024). It includes an introductory chapter retracing the history of the institute and fourteen research papers, six of which are written in Chinese and the remaining eight in English. These papers deal with a variety of topics and languages/language families (including Mandarin Chinese, Taiwanese Southern Min, Hakka (Sinitic), Bodo, Garo, Dimasa, Northern Naga, Jingpho, Asakian, Rgyalrong, Qiang, Horpa, Tibetan (Tibeto-Burman), Ong-Be (Kra-Dai), Amis, Atayal, Puyuma, Rukai and Tsou (Austronesian)) written from various theoretical perspectives and approaches that reflect the array of languages and the range of frameworks faculty members are working on.

This volume is divided into three parts.

The first part deals with historical linguistics, based on findings on diachronic or synchronic data on subgrouping, phonology, language contact and language change, syntax and grammaticalization featuring six papers by Jonathan P. Evans, Jackson T.-S. Sun, Rui-wen Wu, Pei-chuan Wei, Elizabeth Zeitoun, and Min-hua Chiang, respectively. This first part is rooted in the traditions on which the Institute of Linguistics draws from. Jonathan P. Evan's study is a reflection about how to best understand and represent the relationships between three Trans-Himalayan language groups, consisting of Bodo-Garo, Northern Naga and Jingpho-Asakian. Jackson T.-S. Sun investigates the grammatical changes undergone by three languages (Rgyalrong, Qiang and Horpa), spoken in the Sichuan region, through intensive contact. Rui-wen Wu reconstructs two verbs (kã^{2} 'to carry, contain, bring up' and siã^{2} 'to lure, attract something') and one adjective (tĩ^{6} 'full and rising tide') commonly found in Taiwanese Southern Min. Based on the comparative method, he shows that they all ended with a final nasal *-m at an early stage. Pei-chuan Wei investigates the evolution of *dou* 都, whose usage in Middle Chinese differed significantly from nowadays. He argues that *dou*, when binding the subject in Middle Chinese, was only interpreted collectively. The distributive reading developed at a later time. Elizabeth Zeitoun shows that there are no prepositions in Tanan Rukai, contra an analysis proposed by Paul Jen-kuei Li fifty years ago. Min-hua Chiang discusses the modal and aspectual uses and functions of the verb *voi5/6* 會 in Hakka by reassessing its semantic evolution path based on a large corpus.

A second part is dedicated to morphosyntactic topics with papers written by Stacy Fang-ching Teng, and Henry Y. Chang respectively, presenting cross-linguistic studies on Formosan languages. The three papers that follow by Sihwei Chen, Jo-wang Lin, and Wei-wen Roger Liao focus on the interface between syntax and semantics and reflect the strength of ILAS in formal linguistics. Stacy Fang-ching Teng examines denominal verb constructions in Puyuma, Paiwan and Rukai, which she compares to other similar constructions (e.g., incorporation). She discusses their syntactic features while pointing out the challenges this derivational verbal process poses to morphological theories. Henry Y. Chang compares the way different senses of the interrogative word *how* are syntactically realized in Tsou and Amis, and shows that no matter the differences between these two languages, *how*s occur invariably as main verbs. He concludes by discussing the far-reaching implications these findings have for the typology and theory of *how*-questions. Sihwei Chen discusses the use and functions of the negators *iyat* and *ini'* in Atayal, demonstrating that they are not subject to specific temporal or modal references as has been discussed in the literature. Jo-wang Lin offers a formal semantic analysis of pluractional sequence comparatives in Mandarin Chinese, where two parallel nominal *yi*-classifier phrases serve as comparison items. He shows that despite variations across languages, comparable mechanisms and semantic tools can be found universally. Wei-wen Roger Liao examines the syntax and semantics of perception verbs in Mandarin Chinese, showing that they can be divided into two types, depending on different factors, factivity, abilities to express the belief of the speaker or the perceiver, eventualities of the complement etc.

The last part deals with phonetics and phonology and includes three papers by Hui-chuan J. Huang, Yen-ling Chen & Shao-ren Lyu and Shu-Chuan Tseng on Atayal writing system, Yongxing and Mandarin Chinese, respectively. Hui-chuan J. Huang discusses the correspondences between Atayal writing symbols and phonetics, with a focus on the inconsistencies in current writing by pointing out the phonological rules involved in these issues. Yen-ling Chen & Shao-ren Lyu investigate the phonological system of Yongxing, a variety of Ong-Be, spoken in the northwestern part of Hainan island. They show that Yongxing undergoes optional tone alternation and neutralization in non-phrase-final position though such tonal phenomena are not always sensitive to phrasal structures and discusses the implications in the contact of the Kra-Dai language family as a whole. The final paper in the volume, by Shu-

Chuan Tseng, offers new perspectives on deep learning models and corpus linguistics as interdisciplinary methodologies for language acquisition research and building normative databases.

We would like to take this opportunity to thank all the contributing authors, for their patience and cooperation and the reviewers whose comments and criticisms have improved earlier drafts as well as our three editing assistants, Abigail J. Wang, Sandy Y. Yang and Jenny T. Chen who made the publication of this volume possible.

The Editors

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December 28, 2023

中央研究院語言學研究所成所暨新卸任所長處主任交接典禮（2004 年 2 月 20 日）

中央研究院語言學研究所研究同仁合影（2023 年 12 月 18 日）

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On the history and development of the Institute of Linguistics, Academia Sinica

Elizabeth Zeitoun and Shu-Chuan Tseng
Academia Sinica

With this introductory chapter, let us begin the celebration of the vigentennial anniversary of the Institute of Linguistics at Academia Sinica (2004–2024). This introduction will consider the early years, when we were part of the Institute of History and Philology (IHP), and the chapter will narrate the founding of the Institute of Linguistics in 2004 and its growing since then. Emphasis will be on describing our landmarks in various fields, and on introducing faculty members with their range of specialties.

Keywords: 20th anniversary, history, achievements, faculty, prospects

1. Introduction

The Institute of Linguistics at Academia Sinica (ILAS) was officially established on February 20, 2004, at the end of seven preparatory years. We are celebrating its 20th anniversary this year. we recall our founders, most of whom have by now either retired or passed away; and, as time goes by, has gathered newcomer colleagues into the fold. What follows is a brief review of the Institute's history, its achievements, and prospects for the future.

ILAS traces its origin back some ninety-six years to Mainland China when it was part of the Institute of History and Philology; and so we shall start with that stage of our history (§2). Then we turn to a description of current ILAS trends and strengths (§3), and sources of extra-mural funding (§4). After that, we shall outline our academic contributions at the national and international levels (§5), noting as well the Institute's social contributions (§6), with final consideration of our future prospects (§7).

2. Looking back at ninety years of history

In this section, we look back at ninety-six years of ILAS history, roughly divided into three periods: (1) The Linguistics Division as part of the Institute of History and Philology (1928–1997), (2) Preparatory office (August 13, 1997–February 19, 2004), and (3) Foundation and growing of ILAS (February 20, 2004 onwards), with possible overlaps.

2.1 The Linguistics Division as part of the Institute of History and Philology (1928–1997)

The origins of ILAS can be traced back to the very beginning of Academia Sinica, founded on June 9, 1928 in Nanjing (China),[1] and originally constituted of ten institutes (located in Beijing and Shanghai),[2] among which nestled the Institute of History and Philology (IHP). For about ten years before the outbreak of WWII, the Linguistics Division of the IHP (also known at one time as the 2nd Division) was home to renowned linguists and founders of modern Chinese linguistics, Yuen Ren Chao (1892–1982),[3] Fang-Kuei Li (1902–1987), and Chang-pei Luo (1899–1958), joined in 1937 by T'ung-ho Tung (1911–1963), and later, Fa-Kao Chou (1915–1994) and Kun Chang (1917–2017).

During their careers, they pioneered investigations of languages belonging to various language families in Asia, including Sino-Tibetan, Austronesian, and Tai-Kadai; and they established a long tradition of fieldwork in China and later in Taiwan, primarily focusing on comparative, historical, and structural linguistics. Yuen Ren Chao is renowned for his work on all aspects of Chinese grammar, which culminated with the publication of his *Grammar of Spoken Chinese* (Chao 1968). Fang-Kuei Li is best known for his research on Archaic Chinese, comparative Tai, and Old Tibetan. In particular, in his evolutionary study on comparative Tai (Li 1977), he was the first to propose a reconstruction of Proto-Tai and discuss the relationships among Tai languages based on the comparative method. T'ung-ho Tung made far-reaching contributions on historical Chinese phonology, the constrastive study of Min dialects and the

[1] Nanjing was, at the time, the capital of the Republic of China.
[2] As of 2023, Academia Sinica encompasses 24 research institutes and 8 research centers.
[3] Yuen Ren Chao was the first head of the Linguistics Division at the Institute of History and Philology.

Formosan languages, in particular Tsou. His grammar of Tsou (Tung 1964), published posthumously by the IHP, remains one of the best documented works to date.

Yuen Ren Chao left China and settled in the United States in the late 1930s, and Fang-Kuei Li in the mid-1940s. They worked at various American universities until retirement. Chang-pei Luo stayed in China and served as the director of the Institute of Linguistics at the Chinese Academy of Sciences after WWII, until his death in 1958. T'ung-ho Tung followed other researchers and staff of the IHP[4] who flew to Taiwan under the leadership of Ssu Nien Fu[5] in the wake of the civil war in 1948–49. The IHP settled temporarily in Yangmei before Academia Sinica was transferred and permanently relocated to Nankang in 1954.

Many influential linguists were hired subsequently: Pang-hsin Ting in 1963 (elected Academician in 1986), Paul Jen-kuei Li in 1970 (elected Academician in 2006), Dah-an Ho in 1975 (elected Academician in 2010), Hwang-cherng Gong in 1977 (elected Academician in 2002). Pang-hsin Ting resigned from Academia Sinica in 1989 to teach in the United States afterwards, but remained an important figure, and was later one of the most eminent proponents for the establishment of the Institute of Linguistics at Academia Sinica.

The 1980s witnessed two noticeable changes: 1) two women, Chiu-yu Tseng in 1982 and Ying-chin Lin in 1988, were recruited in the Linguistics Division. Women now represent half of the faculty members of the Institute of Linguistics; 2) Academia Sinica launched a "Talent Cultivation Training Program" and the Linguistics Division recruited five of its members through this channel, Pei-chuan Wei in 1985, Jackson T.-S. Sun in 1986 (elected Academician in 2018), Ying-chin Lin in 1988, Su-ying Hsiao and Elizabeth Zeitoun in 1992, to strengthen research on different language areas (Sino-Tibetan, Austronesian, Mongolic, and Tungusic)[6] as well as diverse linguistic fields (e.g., historical linguistics, documentary linguistics) which still have an impact till this very day.

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4 Of the original 10 institutes that constituted Academia Sinica, only two, the Institute of History and Philology and the Institute of Mathematics, were re-established in Taiwan in 1949.

5 Ssu-nian Fu was born in 1896. As a Chinese historian and very charismatic figure, he was one of the founders of Academia Sinica and the director of the Institute of History and Philology upon its establishment in 1928.

6 Mongolic and Tungusic languages were at the time referred to as "Altaic" languages and this is the term we use here though it might not sound adequate now.

2.2 Preparatory office (August 13, 1997–February 19, 2004)

As of 1992, the Linguistics Division (or 2nd Division) was made up of twelve members.[7] As a response to the growing interest and profound transformations in modern linguistics, the emergence of linguistic programs in Taiwan in the 1970s and 1980s, the setting up of a Linguistics Section (as part of the Department of Humanities and Social Sciences) at the National Science Council (later renamed the Ministry of Science and Technology and now known as the National Science and Technology Council)[8] and the premises of interdisciplinary research (with the pioneering work of Chiu-yu Tseng and Chu-Ren Huang), the members of the Linguistics Division took the categorical decision to depart from the Institute of History and Philology. It had become clear that the creation of a dedicated institute of linguistics would strengthen interaction between linguists while intensifying peer stimulation, foster national and international cooperation, while enhancing scholarly exchanges, increase academic productivity by allowing the recruitment of more faculty members, thus broadening the coverage of research fields, topics and languages. It would eventually play an important role in the launch of the Linguistic Society of Taiwan in 1998 and the release in 2000 of the very first (and much-awaited) linguistic journal in Taiwan dedicated to Asian languages, *Language and Linguistics* (and its related monograph series), constituting one of the best options for the publication of linguistic papers and books at the national level.

In the planning for this Institute, members of the Linguistics Division decided to rename their unit "Institute of Linguistics", a process taking over two years, and on August 13, 1997, the preparatory office was officially launched. The two directors of the preparatory office were Paul Jen-kuei Li (1997–2000) and Dah-an Ho (2000–2004).

In the years that followed, new colleagues were recruited, different research fields started to develop including speech corpora as well as psycho- and neuro-linguistics, consolidating the major strength of ILAS. ILAS can thus be characterized for its fundamental research of languages of Taiwan, Southeast Asia, East Asia, and the Pacific Region through mostly first-hand

[7] Members of the Linguistics Division included Paul Jen-kuei Li, Hwang-cherng Gong, Da-an Ho, Chiu-yu Tseng, Pei-chuan Wei, Jackson T.-S. Sun, Ying-chin Lin, Chu-Ren Huang, C.-C. Jane Tang, Randy LaPolla (who left for Hong-Kong in 1995 on a two-year leave and resigned from Academia Sinica in 1997), Su-ying Hsiao, and Elizabeth Zeitoun.

[8] We are referring to the exact titles of the institutions to avoid unwarranted anachronisms.

data collection and analysis on a wide range of research fields, including phonetics, phonology, morphology, syntax, semantics, historical linguistics, psycho- and neuro-linguistics and computational linguistics.

Since 1995, interest groups on language typology, archiving and corpora, as well as phonetics and phonology have been formed, dismantled and remodeled, complementing labs that were established at different times: the Phonetics Lab was established in 1985 and directed by Chiu-yu Tseng until her retirement in 2018; the Brain and Language Lab created in 2002 was supervised by Chia-Ying Lee, and later transformed as part of the Cognitive and Neuro-linguistics Lab (see §2.3).

2.3 Foundation and growing of ILAS (February 20, 2004 onwards)

In February 20, 2004 the Institute of Linguistics was formally established after just six and a half years of preparation. The first director was Chin-Chuan Cheng (2004–2006), followed by Dah-an Ho (2006–2008), Jackson T.-S. Sun (2008–2011), Chiu-yu Tseng (2011–2017) and Jowang Lin (2017–present).

While first housed in the Institute History and Philology, the Institute of Linguistics moved to its permanent quarters at the very beginning of 2007, in the Building for the Humanities and Social Sciences (BHSS).

Progressively, labs and interest groups were reorganized in three divisions, the Digital Language Resource Division, the Speech Technology Division, and the Cognitive and Neuro-linguistics Lab in order to provide more technical support to ILAS members and conduct more effective interdisciplinary research. Thus, while continuing to adopt traditional analytical techniques rooted within generative and functional frameworks, language typology and historical linguistics, interdisciplinary research has been developed to provide all kinds of language resources through computational linguistics and modeling and understand the workings of the human mind through psycho- and neuro-linguistic experiments. ILAS members keep on working and expanding research traced by earlier faculty members mentioned in §2.2 as well as prominent affiliated correspondents, including Chin-Chuan Cheng (elected Academician in 2000), Tsu-Lin Mei (elected Academician in 1994), Ovid J.-L. Tzeng (elected Academician in

1994), William S.-Y. Wang (elected Academician in 1992), and C.-T. James Huang (elected Academician in 2016).

Since its inception, the Institute of Linguistics has also been playing an active and preeminent role in the linguistics community of Taiwan. Before the 2019 novel coronavirus (COVID-19) pandemic slowed down academic activities between 2020 and 2022, it frequently hosted international symposiums, conferences and workshops — academic events resumed normally in 2023 — and invited renowned scholars for periods running from a few weeks to a few months. Faculty members regularly teach at national universities and have offered classes at Summer Linguistic Institutes organized by the Linguistic Society of America (§5.3.2). They are also involved in the development of textbooks and the preparation of national language proficiency tests and whenever necessary provide professional consultation in committees involved in language policies (§6.4).

3. Current trends and strengths of the Institute of Linguistics

In this section, we focus on the research trends and strengths of the Institute of Linguistics over the past twenty years, from 2004 onwards, including historical linguistics (§3.1), functional and documentary linguistics of Sino-Tibetan, Austronesian, Altaic, Kra-Dai, and Austroasiatic languages (§3.2), formal linguistics (§3.3), and interdisciplinary research (§3.4).

3.1 Historical linguistics

As mentioned above, Pei-chuan Wei joined the Linguistics Division at the Institute of History and Philology in 1985, and retired from the Institute of Linguistics in September 2023. For nearly 40 years, he worked (and is renowned) for his work on Chinese historical linguistics, developing the field of historical syntax and tackling a wide range of topics from negation to quantification. He has also built up the Archaic and Early Chinese Corpora (see §3.4.1).

Jackson T.-S. Sun has made notable contributions to diachronic Sino-Tibetan linguistics. He was the first to conduct a thorough phonological reconstruction of Tani languages and propose it as an independent Tibeto-Burman branch. Drawing on primary fieldwork data, he

has also established the Rgyalrongic languages as a distinct Qiangic subgroup on evidence of shared idiosyncratic morphology and shown the innovations of Tibetan stem alternations.

Min-hua Chiang was recruited in 2003 and has been working on Sinitic phonology, Sinitic comparative linguistics and Sinitic comparative grammar. She focuses on Hakka and related dialects/languages such as Gan, Min, Wu, and Cantonese. Min-hua Chiang has been exploring new topics in the field of Hakka grammar, in particular in trying to show grammatical variations between northern and southern Sixian, Hailu, and Dongshi Hakka while tracing back to their origin.

Rui-wen Wu joined the Institute of Linguistics in 2007. His major research interests focus on historical linguistics, in particular with respect to the study of Min (including Southern Min, Eastern Min, and Central Min). He has been working on the historical reconstruction of Min phonology and on a synchronic analysis of Eastern Min grammar. In recent years, he has also expanded his research by carrying out a comparative study of Hakka, Xiang, Jianghuai Mandarin, in order to deepen his understanding of the relationships between ancient and modern Chinese dialects.

Yen-ling Chen was hired at ILAS in 2021. As a historical linguist, she is a specialist of the Ong-Be languages which belong to the Kra-Dai language family, one of the major language families in East and Southeast Asia with several primary branches and a hundred of languages, following a tradition established by Fang-Kuei Li (see §2.1).

It is clear that historical linguistics at ILAS represents an important part of the research of at least half of the faculty members and builds on a long tradition. Research on contemporary languages often incorporates comparative perspectives in order to determine how a specific language has changed. Topics that are covered in historical linguistics include a wide range of aspects (e.g., reconstruction of the phonology, lexicon and morphology of proto-languages, subgrouping, changes in phonology and syntax, language contact and language change) and subsume all the languages investigated at ILAS.

3.2 Functional and documentary linguistic studies on Sino-Tibetan, Austronesian, Altaic, Kra-Dai and Austroasiatic languages

Following the tradition established with the foundation of the Linguistics Division at the Institute of History and Philology, ILAS members have been documenting and investigating various languages in and around Taiwan, belonging to the Sino-Tibetan, Austronesian, Altaic, Kra-Dai, and Austroasiatic language families. While doing so, they have also engaged in cross-linguistic comparisons, taking part in discussion on typology while being also actively involved part in language preservation and revitalization.

3.2.1 Research on Sino-Tibetan languages

Jackson T.-S. Sun was hired at the Linguistics Division, Institute of History and Philology in 1986. For the past thirty years, he has been focusing on Tibetic and Rgyalrongic languages of Sichuan, where he has conducted synchronic as well as diachronic studies. Besides his contributions in historical linguistics (see §3.1), his research encompasses different fields: phonetic and phonology (e.g., phonemic uvularization and pharyngealization in Qiang and Northern Horpa vowels), morphosyntax (e.g., evidentials in Tibetic, irrealis marking and complementation structures in Rgyalrongic) and typology (e.g., tonogenesis types across Tibetic; generic-person marking across Rgyalrongic).

Ying-chin Lin was recruited in 1988 and has been working on two different language families, Sino-Tibetan and Austronesian (see §3.2.2). Her primary research interests lie in Tibeto-Burman comparative linguistics. She has been working on Muya (a Qiangic language) and Tangut (an extinct language, once spoken in northwestern China), for which she is writing a reference grammar. She also worked on Archaic Chinese and worked on Chinese historical phonology.

Jonathan Evans joined ILAS in 2003. His primary field of research is phonetics and phonology, but he has also been working on descriptive syntax and historical reconstruction of the Qiang languages (in southwest China). Recently, he has been working on Tibeto-Burman languages of Northeast India (e.g., Dimasa).

3.2.2 Research on Austronesian languages

Under the guidance and leadership of Paul Jen-kuei Li, who worked on a great majority of Formosan languages, the number of scholars investigating Formosan languages has greatly increased in the past twenty years and ILAS plays a prominent figure in the study of Formosan languages in terms of the coverage of languages studied and the breadth of research topics. The maturation of their research has culminated with the publication of the *Handbook of Formosan Languages: The Indigenous Languages of Taiwan*. Faculty members have all contributed to the description, documentation and analysis of the Formosan languages from different perspectives, working on an array of topics covering phonology, morphology, syntax, semantics and historical linguistics. They have been collaborating with local communities to document endangered languages in order to preserve the cultural heritage and promote linguistic diversity.

Ying-chin Lin worked on the phonology of Puyuma, wrote a sketch grammar of Pazeh and has focused on the documentation and revitalization of Formosan languages.

Elizabeth Zeitoun was recruited in 1992 after having received an MA from National Tsing Hua University as part of an Academia Sinica training program (see §2.1). Henry Y. Chang was hired in 2003, later joined by Stacy Fang-ching Teng in 2008, Hui-chuan J. Huang in 2010, Sihwei Chen, and Edith Aldridge in early 2019. C.-C. Jane Tang[9] also worked over 20 years on the Formosan languages and though Paul Jen-kuei Li retired in 2006, he has been continuing to work extensively on extinct and endangered Formosan languages.

Elizabeth Zeitoun has carried in-depth research on Rukai and Saisiyat and less extensively on Thao, Pazeh-Kaxabu, and Bunun. Stacy Fang-ching Teng has been working extensively on the morphosyntax of the Puyuma dialects and both have collaborated on the synchronic investigation of Kanakanavu and Saaroa. They have also contributed to the reconstruction of PAN morphology through the reconstruction of a number of morphemes. Hui-chuan J. Huang has been working on the phonology of Formosan languages. She has conducted extensive research on diverse dialects of Atayal and Bunun. Her investigations have centered around the phonemic status of glides, sonority hierarchy, and the complexities of schwa.

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[9] Refer to §3.3.1 for a description of the work of C.-C. Jane Tang, Henry Y. Chang, Sihwei Chen, and Edith Aldridge whose work is framed in formal syntax and semantics.

3.2.3 Research on Altaic, Kra-Dai and Austroasiatic languages

Su-ying Hsiao was hired in the Linguistics Division at the Institute of History and Philology in August 1992 to work on "Altaic" linguistics. Until her retirement in August 2022, her research focused on Mongolian (Mongolic) and Manchu (Tungusic), as well as Taiwanese Southern Min morphosyntax.

Yen-ling Chen, besides her work on historical linguistics (see §3.2.1), has also worked on language contact, in particular with respect to Vernacular Atayalic Japanese, the so-called "creole" spoken in northeastern Taiwan.

Jackson T.-S. Sun has documented the vocabulary, sound systems and phonological history of Plang, Va, and Lavïa, three little-researched Waic languages under the Palaungic branch in Austroasiatic.

3.2.4 Role and meaning of ILAS in the study of Sino-Tibetan, Altaic, Austronesian, Kra-Dai, Austroasiatic

ILAS members working on Sino-Tibetan and Austronesian languages have continued to make long-lasting contributions to the field by undertaking textual work and carrying fieldwork on over a dozen Tibeto-Burman languages and nearly all the Formosan languages. They have broadened the array of research topics and perspectives, have been proposing reconstructions and have made revisions to phylogenetic classifications, making Taiwan a recognized hub of Sino-Tibetan and Austronesian linguistics.

In the field of Altaic (Mongolic and Tungusic) linguistics, Su-ying Hsiao is well-known for the online corpora she built up on Mongolian and Manchu, among others, Late and Modern Mongolian Corpora and the Mandchu-Mongolian Laoqida Parallel Corpora. Fang-Kuei Li, the founding father of the Kra-Dai studies, had no successors in Taiwan. Yen-ling Chen, who has done fieldwork on ten Ong-Be varieties, has taken up the torch to continue his work and proposed a reconstruction of Proto-Ong-Be phonology and internal subgrouping.

3.3 Formal linguistics

Theoretical linguistics has always been a substantial part of ILAS and has been adopted in the research of the Formosan languages and Mandarin Chinese, many researchers working in a contrastive perspective.

3.3.1 Formosan languages in a formal perspective

C.-C. Jane Tang was recruited in 1991 in the Institute of History and Philology. With the development of Formosan linguistics, she started to concentrate on issues related to nouns phrases and related constructions, including noun phrase markers, prepositional phrases, nominalization, and complementizers (some of which come from case markers) in Paiwan. Many of her studies were written in a cross-linguistic perspective by comparing the Formosan data with Mandarin Chinese and English.

After having investigated Seediq, Kavalan, and Paiwan, Henry Y. Chang started concentrating on Tsou (and since the late 2010s Amis) morphosyntax, examining noun phrases (in particular, case markers and nominal aspect), verb phrases, especially verb sub-categorization, causative verbs and the status of the object, voice, transitivity, and applicative markers, adverbial verbs and adverbial compounds etc.

Sihwei Chen has been carrying research on temporal and modal semantics in Atayal, Bunun, and Paiwan. She has also started investigating the use of final particles in Atayal.

Edith Aldridge has brought theoretical syntax and historical linguistics together in her cross-linguistic research, which centers around issues on ergativity in Archaic Chinese and in the Formosan languages. In particular, she previously worked on the synchronic grammars of Seediq, Atayal, and Paiwan. In recent years, her attention has turned to Rukai and its implications for understanding the diachronic development of Austronesian languages, proposing a new reconstruction of several aspects of PAN morphosyntax based on natural processes of syntactic change.

3.3.2 Mandarin Chinese in a formal perspective

Chih-hsiang Shu and Wei-wen Roger Liao were recruited in 2011 and 2013, respectively, and have been working on syntax-semantic interface. Chih-hsiang Shu[10] researched on topics related to the role of directionality parameters in syntax, movement structures, and (contrastive) focus while Wei-wen Roger Liao has been investigating various topics on Mandarin Chinese, including topic structures, contrastive dislocations, purposive constructions, bare numeral phrases, aspect (and in particular, durative phrases).

Jo-wang Lin was hired at ILAS in 2014 and has continued to conduct significant research on tense, aspect, quantifiers, *wh*-questions, and relative clauses in Mandarin Chinese.

3.3.3 Role and meaning of ILAS in the field of formal linguistics

Theoretical linguistics provides formal metalinguistic frameworks and tools to analyze and comprehend the structure, function, and patterns of human language. The endeavors of ILAS members in the area of formal linguistics have highlighted the importance of the amassed data on Mandarin Chinese and Formosan languages to scholars worldwide.

For the past ten years, ILAS has tried to strengthen the study of theoretical and formal linguistics by recruiting five linguists working on Mandarin Chinese and Formosan languages and specializing in formal syntax and semantics. They offer different perspectives on a wide array of topics by identifying features and constraints that exist across languages and complement the work carried out by functional linguists in the institute.

3.4 Interdisciplinary research

Interdisciplinary linguistic research began quite early, in the mid- and late-1980s, while colleagues were still working in the Linguistics Division of the Institute of History and Philology.

[10] Chih-hsiang Shu left Academia Sinica in August 2021.

During the course of its 20 years of development, ILAS has gradually established the foundations that reflect its multidisciplinary research structure. It has also matured with respect to its early development of computational and psycho- and neuro-linguistic research.

3.4.1 Computational linguistics

Chu-Ren Huang, who left Academia Sinica in 2010, was undoubtedly one of the leading, representative figures in computational and corpus linguistics, setting the foundation for the development of the Academia Sinica Balanced Corpus (henceforth Sinica Corpus) and the Association for Computational Linguistics and Chinese Language Processing in the 1990s, and having a profound impact on the research era of Chinese language processing in Taiwan since then. The Sinica Corpus was, in the 1990s, the first proportionally sampled Chinese corpus with texts of different lengths and genres and part-of-speech tagging. With Pei-chuan Wei, he co-founded the Corpus Research Group, which focused on compiling and building corpora of Modern Mandarin Chinese and Archaic Chinese. While the Early-Modern Chinese Lexicon aims at constructing a knowledge system of Chinese language evolution from the early modern to the modern era, the Archaic Chinese Corpora offers numerous pre-modern Chinese texts from the Western Han dynasty with linguistic information, word segmentation and lexical class labels.

Importantly, in 2005, Chu-Ren Huang joined the Taiwan International Graduate Program (TIGP) to promote cooperation with top national universities in Taiwan in computational linguistics and establish Chinese processing programs in order to train young generations in the field of computational linguistics at the national and international levels.

3.4.2 Corpus linguistics, computational modeling and acoustic investigations

Ahead of the establishment of the Preparatory office of ILAS in 1997, Chiu-yu Tseng established the Phonetics Lab and conducted corpus-based research on prosody and speech synthesis with computer scientists from renowned universities. After having worked in the 1990s on tones and aphasia and its impact on phonetic production, Chiu-yu Tseng worked for

over a decade on prosodic features and their functions in fluent continuous speech, constructing the Sinica COSPRO (Mandarin Continuous Speech Corpora) and Toolkit. She also collaborated to an international project on Asian English Speech Corpus (AESOP), examining L2 English produced by Taiwan Mandarin speakers from 2009 until retirement and collecting over 800 hours of speech corpora.

Shu-Chuan Tseng joined ILAS in 2000, and adopted corpus-based and quantitative research methods and expanded it to computational analysis and machine learning modeling. Her research has focused on phonetic variation and discourse representation of conversational spontaneous speech. She has created and released a variety of spoken Chinese language resources, including conversational corpora, sociophonetic interviews, child speech corpora, spoken wordlists, core vocabulary and automatic phone aligner tools that produce multi-layer phonetic and lexical linguistic information, moving towards technology-assisted research and application of speech acquisition. She has also carried out projects on speech analysis of children with normal hearing and hearing impairment.

Sheng-Fu Wang was hired at the end of 2022. He is bringing novel perspectives to laboratory phonological research on Taiwanese Southern Min by applying innovative computational methods to large-scale speech datasets.

3.4.3 Psycho- and neuro-linguistics

Early in the 1990s, Ovid J.-L. Tzeng established the foundations of neuro-linguistic research on Mandarin Chinese in Taiwan and this line of research has also blossomed at ILAS. Ovid J.-L. Tzeng and Chia-Ying Lee founded the Cognitive and Neuro-linguistics Lab. They have been conducting intensive research to study the cognitive and neural mechanisms behind language acquisition and reading comprehension, as well as the causes and consequences of language impairment and dyslexia, with close collaborations with hospitals and domestic and international universities, with the aim to establish a comprehensive neurocognitive model for Chinese language processing.

3.4.4 Role and meaning of ILAS in interdisciplinary research

While interdisciplinary research was previously treated at the margin of linguistics, it has become clear that technology-driven quantitative methodologies fully belong to the field of linguistics and complement nicely other fields such as formal linguistics, functional linguistics, comparative linguistics, sociolinguistics etc.

Faculty members have been using computational tools, natural language processing, and machine learning techniques to analyze linguistic data, automate annotation processes, and develop language resources. By integrating technological advancements into their research, they have contributed to advancements in language technology and applications.

4. Extramural funding: Research stability and sustainability

The Language Archives Project, carried out from 2000 until 2013 was the largest project ever conducted at ILAS in terms of (1) number of PIs, (2) project duration and (3) funding. Seven ILAS members participated in the project which was divided into two sub-projects: Chinese Language Archives and Formosan Language Archives. Accounting for written and spoken language documentation and the construction of language resources and query systems, the Language Archives Project dealt with modern and ancient Mandarin Chinese, Taiwanese Southern Min and Hakka as well as Formosan languages. This project laid the groundwork for the digitalization of corpora with the constructions of annotated language resources for documentation (based on first-hand data collection) and linguistic research. ILAS's Digital Language Resource Division has been constantly working on the maintenance and extension of the outcomes of the Digital Language Archives Project.

ILAS members have also been able to carry out "Excellence projects", "Thematic projects", and "Investigator Award projects" sponsored by Academia Sinica which provide additional long-term financial supports for cultivating potential new research areas. Over the years, ILAS members have also conducted projects granted by the National Science and Technology Council of Taiwan.

5. Academic contributions at the national and international levels

ILAS comprises a group of faculty members with unique expertise in various fields of linguistics, and together they have made many different contributions at the national and international levels.

5.1 Language and Linguistics

Language and Linguistics is an international quarterly journal that aims at promoting theoretical and empirical linguistic studies on Asian languages. In addition to regular issues (with 6 or 7 paper per issue), 26 special issues have been published since 2000 covering a wide variety of themes and topics. The *Language and Linguistics* monograph series includes 76 monographs comprising thematic volumes on different Asian languages, post-conference proceedings, texts, dictionaries, collected papers and translated books have been published.

As mentioned in §2.2, *Language and Linguistics* was launched in 2000, with Hwang-cherng Gong as the first Editor-in-Chief and Dah-an Ho as the Associate Editor. From 2002 to 2008, Dah-an Ho was the Editor-in-Chief, with Elizabeth Zeitoun as the Deputy Editor-in-Chief between 2007 and 2008. Between 2008 and 2013, C.-C. Jane Tang was chosen as the Editor-in-Chief, and Elizabeth Zeitoun as the Executive Editor. Since 2013, *Language and Linguistics* has been managed by an Editor-in-Chief (C.-C. Jane Tang 2013–2016, Jo-wang Lin 2017–2019, Henry Y. Chang 2020–2022, Edith Aldridge 2023–present) with internationally renowned scholars serving as Associate Editors.

Under the leadership of Dah-an Ho, *Language and Linguistics* was included in the LLBA in 2003, the MLA and A&HCI citation indexes as well as the Social Science Citation Index database (SSCI) in 2008. It was indexed by ProQuest and Elsevier in 2012. *Language and Linguistics* was published in partnership with the international publisher SAGE from 2014 to 2016 (Volumes 15–17) and since 2017 (Volume 18), with John Benjamins Publishing Company. Since 2022, *Language and Linguistics* is an open access journal.

5.2 Linguistic Society of Taiwan

In 1998, Paul Jen-kuei Li was elected as the president of the Preparatory Office of the Linguistic Society of Taiwan (LST), in which he had stood as one of the principal founders. Chu-Ren Huang served as LST's 4th President, and Su-ying Hsiao its 11th President.

Since its inception, ILAS has consistently supported LST, not only through academic contributions by ILAS members, but also through administrative management of membership affairs, co-hosting conferences, tutorials, and linguistics camps. Paul Jen-kuei Li was granted a Life-time Achievement Award in 2005, Hwang-cherng Gong in 2006, Dah-an Ho in 2009, Chin-chuan Cheng in 2011, C.-T. James Huang in 2014, Pang-hsin Ting in 2016, Chiu-yu Tseng in 2020, and Jackson T.-S. Sun in 2022.

5.3 Academic participation in Taiwan and abroad

ILAS has been fostering a supportive academic environment by organizing conferences, sponsoring training programs, being engaged in student supervision and teaching while establishing collaborations at the national and international levels.

5.3.1 Organization of conferences

For the past twenty years or so, ILAS has continued its long tradition in organizing symposiums, conferences, workshops, courses that have helped promote the different fields which ILAS members are specialized in. It has held several first-tier international conferences in collaboration with universities and associations, including the International Conference on Austronesian Languages (ICAL) in 1997 and 2015, the Austronesian Formal Linguistics Association (AFLA) in 2012 (AFLA-19) and in 2018 (AFLA-25), the Workshop on Sino-Tibetan Languages of Southwest China (STLS (2008)), ROCLING (1988, 1989, 1993, 1997, 2004), and COLING (2002). It also held the Young Scholar Symposium in 2018, co-sponsored by the Li Fang-Kuei Society. The biennial International Symposium in Chinese Language and Linguistics (IsCLL), initiated and hosted by ILAS, and held every two years between 1990 and

2016, used to be one of the largest domestically held linguistics conferences. It featured a wide diversity of themes related to languages of China and Taiwan. Following IsCLL, the first ILAS Annual Linguistics Forum (ILASALF) took place in 2018. Since 2021, it is being held every other year; the official title of this conference has been changed to Academia Sinica Linguistics Forum (ASLF).

5.3.2 Training programs, supervision and teaching

ILAS has been sponsoring all kinds of training programs at the post-MA level, PhD students, PhD candidates and Post-doctoral fellows that equip students with a strong foundation in linguistic theory, research methods, and data analysis. Faculty members have been (co-)supervising MA and PhD students in universities in Taiwan and abroad (in Europe and Australia). A majority of faculty members regularly offer specialized courses, seminars at national universities in northern Taiwan (National Taiwan University, National Taiwan Normal University, National Chengchi University, National Central University, National Yang Min Chiao Tung University, National Tsing Hua University) and research opportunities. A few have also given lectures at different Summer Linguistic Institutes organized by the Linguistic Society of America.

5.3.3 National and international collaborations

ILAS members have very close ties to local and international scholars, collaborating on various research projects with visiting scholars from universities and research institutes in Taiwan and abroad. In the past, ILAS established long-term reciprocal visits and research collaborations with the National Institute for Japanese Language and Linguistics, the Institute of Linguistics of the Chinese Academy of Social Sciences, and the Center for Chinese Linguistics of Peking University, though some of these cooperation programs have been disrupted by COVID-19.

6. Social contributions

Linguists at ILAS have contributed in many ways to the advancement of the study of language in the Taiwanese society. Since the early 1990s, institute members have collaborated with educational institutions, government agencies, and language communities to develop language-related policies, language learning resources, and initiatives that promote linguistic diversity.

6.1 Open House

Under the impulse of former Academia Sinica President, Yuan Tseh Lee, and in order to bring research closer to the public and popularize both hard and soft science, Academia Sinica has been holding the "Open House" every year since 1998. Since October 1999 (just a month after the devastating 7.3 earthquake on September 21, 1999), ILAS has been engaged in Open House activities. Each year, it features different themes and research perspectives to allow different subfields of linguistics to be more accessible to the general public.

6.2 Dissemination of linguistic knowledge

Many Formosanists have written reference and/or sketch grammars, edited teaching materials and texts, co-worked with native speakers to edit (online) dictionaries,[11] and are engaged in teaching grammar to heritage speakers. Several faculty members have participated in Professor Paul Jen-kuei Li's project in translating Blust (2013) to Chinese, a monumental work on Austronesian languages of over eight hundred pages. Having been published by Linking Publishing Company in 2022, this book contributes to raising public awareness and understanding of Austronesian languages.

For years, faculty members have also written more popular science articles in Chinese for Academia Sinica newsletter which later became the e-newsletter entitled 研之有物 to promote knowledge on language and linguistics.

[11] Online dictionaries have been sponsored by the Council of Indigenous Peoples.

6.3 Learning applications

Shu-Chuan Tseng has completed a normative dataset of Chinese-speaking preschoolers that includes accuracy and acceptability judgement for clinical and machine learning applications of children's phonological development.

For the past ten years or so, Chia-ying Lee has developed several APPs for children and elderly, including the "Zhu-Yin adventurer" APP and the "Harvest season" APP to assist Chinese literacy acquisition and the "Cookies for the brainy day" APP, to support cognitive training.

6.4 Collaborations with government agencies

Dah-an Ho, Jackson T.-S. Sun and Jo-wang Lin served as conveners of the Linguistics Division of the National Science Council.[12]

Some faculty members have also taken part in program reviews of universities and primary schools where "local" languages are being taught, and served as consultants at different governmental institutions (Taipei City Aboriginal Council, Council of Indigenous Peoples of the Executive Yuan, Ethnic Affairs Commission of Inner Mongolia, Ministry of Education, Ministry of Culture).

They are regularly consulted on several projects initiated by the Council of Indigenous Peoples, the Foundation for the Development of Indigenous Languages, the Hakka Affairs Council, the Ministry of Education and share their expertise on corpora and writing systems.

They have also been helping to ensure the quality and accuracy of national tests for Formosan languages and Hakka.

[12] For the different names that have changed over the years of this institution, please refer to §2.2.

7. Prospects

As linguistics evolves over time, new frontiers of interdisciplinary and quantitative research are flourishing. Faculty members at ILAS remain committed to advancing diverse domains. This includes conducting thorough language surveys and documentation, delving into theoretical explorations of language, and exploring the potential applications of linguistic theories.

A key aim of ILAS is to construct models or theories that capture the fundamental properties of language so as to make linguistic research at ILAS ever more significant. Faculty members will collectively contribute to ILAS's growth, reputation and impact in the field of linguistics by continuing to build on the strengths in empirical and theoretical linguistics outlined above. They will widen the array of studies in core linguistic, broaden interdisciplinary research, adapt to technological advancements, participate in collaborative research initiatives, and engage in public activities. However, as ILAS adapts to a rapidly changing research environment, it will ensure that new advancements in methodology and technology will always be firmly grounded in the understanding of language brought about by core linguistic research.

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Online resources

Institute of Linguistics

http://www.ling.sinica.edu.tw

Language and Linguistics

http://www.ling.sinica.edu.tw/item/zh-tw

Online corpora

https://www.ling.sinica.edu.tw/main/zh-tw?code=list&ids=23

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Re-evaluating the Sal hypothesis

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The present study reassesses the Sal hypothesis, a proposed meso-level node of the Sino-Tibetan (Trans-Himalayan) language family, consisting of Bodo-Garo, Northern Naga, and Jingpho-Asakian language groups. An evaluation of the most explicit arguments of shared lexical inheritance finds that the supporting data is equivocal in its support for a Sal node. Morphological arguments are potentially stronger, but thus far only validate certain relationships within the putative group. By using a dynamic language relationship model (a.k.a. "cloudy tree"), it is possible to represent what is known about the three language groups, as well as their external influences, without succumbing to some of the methodological weaknesses inherent in both the family tree and the fallen leaves models.

Keywords: Stammbaum, language family, Sino-Tibetan, language area, language change, historical linguistics

1. Introduction

Language subgroups are proposed on the basis of exclusively shared innovations (Hock 1991). Within the Sino-Tibetan ("Trans-Himalayan") language family, in a region lying in Northeast India, Northern Myanmar, and adjacent areas of Yunnan, China, researchers have noted linguistic affinity among the Bodo-Garo, Northern Naga and Jingpho-Asakian groups since Grierson (1903) coined the term "Bodo-Nāgā-Kochin". Burling (1983; 2003) proposed a meso-level group of Bodo-Garo, Northern Naga, and Jingpho, labeling the languages "Sal" in reference to the proposed shared lexeme *sal 'sun/day'. To Burling's credit, he carefully hedged his proposal, noting that the data available at that time were not adequate to support an unassailable subgrouping. To quote him at length:

"The final judgement about sub-grouping should rest upon a close understanding of all types of shared innovations of the sub-group and upon a detailed understanding of the phonological correspondences among the languages. In our present state of knowledge about Tibeto-Burman languages, however, we must usually be content with an examination of simpler lexical similarities. We are reduced to the following fairly obvious and simple presumptions: if a group of languages 1) share lexical items that other languages

fail to share, 2) show no sign that these shared terms are due either to mutual borrowing or to the residue of a still earlier stage of the language, and 3) have similarities that go beyond those expectable by simple chance, then it is plausible to conclude that these languages shared a period of common innovation and thus form a sub-group within the larger family." (Burling 1983: 2)

"… This looks like a group of languages with some sort of historical relationship." (Burling 1983: 15)

As one reviewer pointed out, Burling's optimistic proposal of a Sal subgrouping was marked with notes of caution, where he points out that definitive support was still wanting. In spite of Burling's caution, numerous subsequent publications have referenced a Sal group, without noting its provisional status, and also without providing additional support of the type that Burling called for.

The primary thrust of the present study is to evaluate Burling's first "presumption": that the languages under consideration "share lexical items that other languages fail to share."

The final adjustment to the constituency of Burling's (1983) Sal group, as defined here, is contributed by Matisoff (2013), who demonstrated that Jingpho should be grouped with Luish into its own subgroup. He also proposed the term Asakian, to replace the pejorative "Luish," cf. Post & Burling (2017: 235). We shall refer to this cluster as Jingpho-Asakian. In accord with Shafer's (1955) earlier proposal, Bradley (1997: 20–27), Burling (2003: 175) and Matisoff (2013) argue for a closer grouping between Bodo-Garo and Northern Naga (Figure 1).

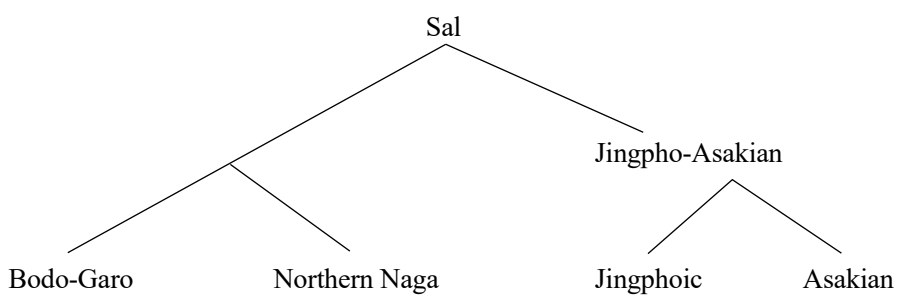

Figure 1. Proposed structure of Sal subgroup (based on Bradley 1997; Burling 2003; Matisoff 2013)

In terms of Sal-adjacent groupings, Bradley (1997) suggests that Kuki-Chin and Pyu could be closely related to Sal. Peterson (2009) suggests a connection between Mruic and Bodo-Garo, and remains open as to whether this connection is above or below the Sal node.

Jacquesson & van Breugel (2017) propose an alternative to Sal, in which Bodo-Garo links with more southerly languages, such as the Zeliangrong group ("Zemeic"), within Kuki-Chin-Naga, rather than with Northern Naga and Jingpho-Asakian. This analysis depends primarily on the retention of Proto-Tibeto-Burman ("PTB") *diphthongs. However, linguistic subgrouping is usually based on exclusively shared innovations, rather than shared retentions, as languages in separate branches can retain some of the same features of the proto-language. For example, both Rgyalrongic and Written Tibetan languages retain many of the complex onset clusters of PTB. Nevertheless, the languages are in separate Rgyalrongic and Bodic sub-branches of the family. On the other hand, using the test of shared phonological innovations, Karenic languages can be convincingly subdivided (Manson 2011). Another issue that weakens the argument in Jacquesson & van Breugel (2017: 120) is that "The resemblance is exemplified in only a small number of words.". Thus, the proposed shared retention has been demonstrated in only a small subset of the relevant languages. In the absence of a more substantial argument linking Bodo-Garo with Zeliangrong and Kuki-Chin-Naga languages, the attention in this paper will focus on the Sal hypothesis.

Supportive arguments for a Sal grouping come from Burling (1983) and Matisoff (2013). Burling (1983) proposed about 130 sets of corresponding words that he proposed as evidence for a Sal group. Matisoff (2013) re-evaluated these sets and found that most of them contained general Sino-Tibetan roots, or borrowings, or were not cognate. From among Burling's (1983) proposed sets, Matisoff identified about forty word sets that he considered to be solid exemplars of a Sal grouping, and also identified many Asakian cognates. §2 of this paper evaluates the contribution of these exemplars to the Sal hypothesis, especially in light of newer data than Burling had access to in the early 1980's. By bringing in more language data, both Sal-internal and -external, it will be shown that the residue of probable lexical innovations is actually much smaller than what Burling (1983) and Matisoff (2013) propose.

In addition to the above-mentioned lexical approach, DeLancey (2011) and van Dam & Muheim (2023) explore various morphological properties of the languages in question, in order to evaluate the plausibility of a Sal meso-level grouping. §3 considers their evidence for Sal-level morphological innovation. §4 presents some conclusions and suggestions for fine-tuning the Sal hypothesis.

In the discussion within this paper, I use the term "Sino-Tibetan" for the group of languages also known as "Trans-Himalayan". "Tibeto-Burman" is shorthand for non-Sinitic languages of this group. No particular theoretical claims are suggested by the choice of nomenclature.

2. Evaluating the Sal hypothesis

Coupe (2012) and Matisoff (2013) take two complementary approaches in evaluating Burling (1983). Coupe (2012) looks at Burling's (1983) "most promising" lexical innovations (Burling (1983: 19, Table 1a) from the perspective of Northern Naga, bringing in fresh data, and also evaluating relevant PTB roots. He concludes that eight of the roots remain potentially convincing.

Matisoff (2013) evaluates all of Burling's (1983) proposed illustrative lexica, particularly from the perspective of Jingpho-Asakian. In evaluating Burling's proposed Sal cognate sets for shared innovations, Matisoff filters out words that have a non-Sino-Tibetan provenance, such as 'falcon, kite, bird of prey' from Austroasiatic. He also filters out words with Sino-Tibetan cognates outside of the Sal languages, such as 'far' from PTB *dzya:l. On pages 41 to 47 of Matisoff (2013), about forty of the word sets from Burling (1983) are identified as supporting the Sal hypothesis, due to apparent shared innovation. Those sets are again evaluated here for evidence of an origin other than Proto-Sal. After undergoing this scrutiny, a few sets are still consistent with Sal-level innovation. These are presented first in the following discussion.

Before presenting the data, a word explaining the organization of the following tables is offered in service to the reader. A row under the header is reserved for reconstructions. Proto-Bodo-Garo reconstructions are given in the order of Joseph & Burling (2006), followed by Burling (1959). If only one reconstruction is available, then the form from Joseph & Burling (2006) is given before the semi-colon, or the Burling (1959) form appears after it. If the two sources have identical reconstructions, then only one is given without a semicolon. Supportive forms in Joseph & Burling (2006) follow the helpful convention that segments or tones that do not conform to the sound laws are presented in parentheses. Thus, the Tiwa form /kó/ 'fall' is transcribed /k´(o)/, because the initial and tone display the expected values; the vowel is exceptional. The parentheses are not shown in the data cited here. Northern Naga reconstructions come from French (1983). Support for Jingpho-Asakian exists in cognate set form only; sound laws have proven to be elusive, even between Jingpho dialects (Keita Kurabe, pers. comm.). On the Jingphoish side, Southern varieties (e.g., Jingphaw (Burma), Jingpo (Yunnan), and Gauri) maintain more segmental distinctions than do Northern varieties (e.g., Singpho, Duleng), where more mergers have occurred (Keita Kurabe, pers. comm., cf. Kurabe 2014)).

The tables of cognates are organized as follows. Supportive forms from Burling (1983), Coupe (2012) and Matisoff (2013) are listed first in their respective columns. Chang and Khiamniungan forms from Coupe (2012) are labeled with C. Atong forms taken from van Breugel (2014), when they differ from earlier sources, are labeled Atong B. Koch forms come from Kondakov (2015). Dimasa L forms come from Longmailai (2014). Jingpho forms with tone

numbers are from the STEDT database (*The Sino-Tibetan Etymological Dictionary and Thesaurus*, Matisoff 2015), usually ultimately from Huang et al. 1992. Forms under "Other ST" are taken from the STEDT database, unless marked otherwise. Resources for language data are given at the end of the paper, before the references. Individual glosses are only given when they are semantically exceptional from the headword.

The organization of information sources within the following tables is as portrayed in Table 1. Language data have been re-transcribed to conform to IPA standards, including Proto-Bodo-Garo and Proto-Northern Naga. STEDT reconstructions have not been edited.

Table 1. Organization of source data in the following sets

Bodo-Garo	**Northern Naga**	**Jingpho-Asakian**	**Other ST**
PBG [a] (JB06; B59)	PNN (F83)	(No published PJA)	PTB from STEDT (with set number)
BG forms: B59, B83, M13, STEDT, Atong B, Koch	NN forms: C12, B83, F83, M13, STEDT, Chang C, Khiamniungan C	JA forms: B83, M13, STEDT	Other sources

a. PBG stands for Proto-Bodo-Garo, PNN for Proto-Northern Naga, PJA for Proto-Jingpho-Asakian, BG for Bodo-Garo, NN for Northern Naga, and JA for Jingpho-Asakian. JB06 refers to Joseph & Burling (2006), B59 to Burling (1959), B83 to Burling (1983), M13 to Matisoff (2013), C12 to Coupe (2012), and F83 to French (1983).

In the subsequent sections, supporting cognates are grouped according to the subgroups in which they are attested, beginning with etyma that are attested in the three subgroups, and not elsewhere in Sino-Tibetan.

2.1 Best supporting sets

In this section, we examine the cognate sets that are attested among Sal languages, but are not attested outside of the group. Not surprisingly, the first set to examine is *sal 'day/sun'.

Table 2. ‘Day/sun’ cognates

Bodo-Garo		Northern Naga		Jingpho-Asakian		Other ST	
*sal		*cəl				*tsyar (2753)	
Boro	sàn	Mo-shang	roŋ-ʃar	Jingpho	tʃan^{33}	Bahing	tʃǎr
Dimasa [a]	sajn	Nocte	san	Kadu	səmíʔ		
Kok-borok	ʃa	Yogli	raŋ ʃal	Sak	cəmíʔ		
Garo	sal	Wan-cho	raŋ han	Ganan	ʃəmíʔ		
Atong B	raŋ san	Chang	*can ŋ̍u				
Tiwa	sâl						
Rabha	sàn						

a. Evans & Langthasa (2024).

Burling’s (1959) Bodo-Garo reconstruction forms the eponym for the group of languages. French (1983) notes that the first syllable in the Moshang, Yogli, and Wancho forms (as well as the Atong B form) is the ‘sky/weather’ morpheme (cf. Table 12). In the Asakian languages, the cognate form is realized as a prefix (Matisoff 2013). On the basis of the Bahing (Western Kiranti) form, Benedict & Matisoff (1972, *Sino-Tibetan: A Conspectus*, henceforth “STC”) and STEDT reconstruct an etymon at the PTB level. However, the Bahing form demonstrates a large semantic distance from the pan-Sal ‘day/sun’ meanings. Furthermore, Michailovsky (1989) gives the semantically-proximal Bahing /d̪ap-/ ‘shine (of the sun)’ (from the STEDT). Thus, despite claims to the contrary, it appears that the *sal etymon might be shared by only the putative Sal languages.

The following three cognate sets appear to exist only in Sal languages, and do not appear to have wider attestation in Sino-Tibetan.

Table 3. ‘(A)live/green’, etc., cognates

Bodo-Garo		Northern Naga		Jingpho-Asakian	
*thaŋ^{1}; *taʔŋ ‘green’, *taŋ ‘live’		*t(o/u)ŋ (jpe)			
Boro ‘green’	gəʔ-taʔŋ	Chang C	saŋ^{11}tɯŋ^{55}	Sak	túŋ
Boro ‘live’	taŋ-nəʔ	Nocte	atoŋ		
Garo	taŋ-	Tangsa	lun-toŋ		
Tiwa	taŋ	Phom	t^{h}ɯŋ^{55}		
Dimasa	gtaŋ;				
Dimasa L	tàŋ				
Kokborok	taŋ				

Although not presented in Burling (1983), the Sak form appears to be cognate, establishing a set with representation in all three Sal branches, and with no known extra-Sal cognates; no Jingpho cognate has been identified. The Northern Naga forms are from Burling (1983) and Burling & Phom (1998); no Northern Naga reconstruction has been provided. French (1983) presents other words for '(a)live'/ 'green', etc., which Coupe (2012) connects with PTB *raŋ 'live/alive/green/raw/give birth' (Matisoff 2003) and *s-riŋ 'live/alive/green/raw' (STC, *404).

Table 4. 'Pestle' cognates

Bodo-Garo		**Northern Naga**		**Jingpho-Asakian**	
*mol ~ *man (jpe)		*mol ~ *man (jpe)		*mu(n/ŋ) (jpe)	
Garo	rimol; imol	Tangsa	mol	Jingpho	t^hum mun, thu^{31} mun^{33}
Bodo	rəmən	Nocte	man	Sak	múŋ
Atong	aman	Phom	mA^{55}		
		Wancho	mAn^{52}		

Burling (1983) connects the first cited Garo form with Nocte, Tangsa, and Jingpho; the form /imol/ is from Garo Mission, American Baptist Foreign Mission Union (1905). Further support for this set comes from Wancho and Sak. French (1983) does not propose a set for Northern Naga 'pestle'. A form like *mu(n/l) seems to be a common ancestor; no extra-Sal examples have been found. The Tiwa form /lom-p^hór/ (and Joseph & Burling's (2006) reconstruction *lɯm^1) reflect a different etymon. A concern expressed by Matisoff (2013) is that as a cultural item, 'pestle' is easily borrowed, although no donor language has been identified. Lending support to the possibility of borrowing is the near-identicality of forms across the three groups, especially Bodo-Garo and Northern Naga. The first morpheme of the Jingpho forms comes from PTB *(t)sum 'mortar' (STEDT).

Table 5. 'Rice (uncooked)' cognates

Bodo-Garo		**Northern Naga**	
*maj^1-roŋ; *majʔ-roŋ		*C-wuŋ	
Boro	majʔ-roŋ	Chang C	aŋ^{11}
Garo	me-roŋ	Konyak	woŋ
Atong	maj-roŋ	Nocte	voŋ
Tiwa	rôŋ	Moshang	vuŋ
Rabha	maj-rùŋ	Wancho	voŋ
Koch	maj ɾuŋ	Chang	aŋ

The first morpheme in most of the Bodo-Garo ‘rice (uncooked)’ forms descends from PTB *may⤫mey ‘rice’ (Matisoff 1985), which has reflexes across the language family, including Chinese 米 (Mandarin *mǐ*). The second morpheme of the Bodo-Garo forms appears to be cognate with the Northern Naga forms (Matisoff 2013), and does not seem to have extra-Sal cognates. While this set seems to suggest shared innovation, there are no forms appearing in the Jingpho-Asakian group. Because of this gap, the form is consistent with, but does not suggest a Sal mesolevel.

To date only these three or four sets, ‘sun/day’, ‘live/green’, ‘pestle’ and ‘rice (uncooked)’ appear to have both a shared origin within this group of languages, and also to lack cognates outside of the group; i.e., to be shared innovations. Pestle and rice are easily borrowed cultural items, and ‘rice (uncooked)’ is not attested in Jingpho-Asakian. One could wish for a more substantial foundation for the hypothesis.

2.2 Sets in all three subgroups, with Sal-external cognates

This group of sixteen cognate sets have representative forms in all three Sal branches. The first three of these sets (‘hand/arm’, ‘foot/leg’, ‘finger’) overlap in semantics and some morpheme composition.

Table 6. ‘Hand/arm’ cognates

Bodo-Garo		**Northern Naga**		**Jingpho-Asakian**		**Other ST**	
*dʒak		*glək		*l-tak (jpe)		*lak (695)	
Garo	dʒak	Konyak	jak	Jingpho	lətáʔ	WT	lag
Tiwa	já	Nocte	dak	Jingpho	tạʔ^{55}	WB	lak
Rabha	cák	Tangsa	dʒak	Kadu	tāk	PTani	*lak
Wanang	cak-toŋ	Moshang	jok pʰa	Chairel	lɑk	PLoloish	*lak^{L}
Atong B	cak	Yogli	jak				
Koch	tʃɑk	Wancho	cak				
Dimasa L	jaū	Phom	lak				
		Chang	jik				

Here and below, some Proto-Jingpho-Asakian forms are provisionally reconstructed for the purpose of capturing known sound relationships, such as *-k > Jingpho -ʔ in ‘hand’.

Table 7. ‘Foot/leg’ cognates

Bodo-Garo		Northern Naga		Jingpho-Asakian		Other ST	
; *dʒaʔ		*gla^{A}		*l-ta (jpe)		*la (350)	
Garo	jaʔ-a	Yogli	ja	Kadu	ta	Mimi	lai
Atong B	caʔ	Moshang	ja	Sak	á-ta	Sulong	læ^{33}
Rabha	cá-	Nocte	da	Jingpho	lǎ^{31}ko^{33}	PTani	*lə
Wa-nang	ca-	Wancho	ca, cja			Tshona	le^{13} mɛʔ^{53}
Garo	jaʔ-a	Konyak	ja			Hayu	le
Koch	tʃɑ t^{h}uŋ	Phom	la			[…]	

Both ‘hand’ and ‘foot’ descend from well-attested Proto-Tibeto-Burman roots, where the ‘hand’ form has the structure of the ‘foot’ form with an added *-k. Matisoff (2013) claims that the correspondence of final k-like sounds in ‘hand’ and the absence of a final stop in ‘foot’ words reflects a “special relationship” between Bodo-Garo and Northern Naga. However, not only are the individual roots widespread, other languages also show this ±*-k semantic relationship; e.g., Proto-Tani *lak ‘hand’, *lə ‘leg’. Many ST languages do not directly preserve final *stops, which could add to the challenge in identifying extra-Sal reflexes of this word pair.

Table 8 isolates examples where Sal languages have cognates for the two related ‘hand’ and ‘foot’ morphemes, as well as some key reconstructed and ancient attested forms for comparison.

Table 8. Related ‘hand/arm’ and ‘foot/leg’ morphemes

	hand	**foot**		**hand**	**foot**
PBG	*dʒak	*dʒaʔ	PNN	*glək	*gla^{A}
Garo	dʒak	jaʔ-	Konyak	jak	ja
Rabha	cák	cá-	Nocte	dak	da
Wanang	cak-	ca-	Yogli	jak	ja
Atong	cak	caʔ	Moshang	jok	ja
Koch	tʃɑk	tʃɑ	Wancho	cak	ca
			Phom	lak	la
	hand	**foot**		**hand**	**foot**
PJA	*l-tak	*l-ta	PTB	*lak	*la
Jingpho [a]	lətáʔ	lǎ^{31}	PTani	*lak	*lə
Kadu	tāk	ta	WT	lag	
Chairel	lɑk	lɑ	WB	lak	
Ganan	tɑk^{3}	tɑ^{1}	OC	*lik 力	
Lui	lök	la			

a. It is not obvious that the first syllable of /lǎ^{31}ko^{33}/ is ‘hand’, rather than a prefix. However, Marrison (1967) records /la kra/ ‘right hand’ and /la pai/ ‘left hand’, which confirm the semantics of the initial syllable.

In the following set for ‘finger’, full forms include an initial ‘hand’ morpheme; e.g., Garo /dʒak-si/ ‘finger’. For the purpose of comparison, only the ‘finger’ morpheme of the compounds is presented here. Across the language family, PTB *(t)si ‘finger’ reflexes seem to always occur as bound morphemes or within compounds.

Table 9. Cognate ‘finger’ morphemes

Bodo-Garo		Northern Naga		Jingpho-Asakian		Other ST	
*-si;		*-cuəy				*(t)si (331)	
Dimasa	-si	Yogli	-ʃi ‘thumb’	Sak	ʃiʔ	Karbi	-chi-
Garo	-si	Nocte	-su			Bunan	-si
Tiwa	-sí	Tangsa	-si			Tamang	-tsi
Rabha	-si ‘hand’	Moshang	ʃi			Yi (Mojiang)	-tsi^{55}
Atong B	-si						
Koch	si						
Dimasa L	-ʃĩ						

The first morpheme in the Bodo-Garo and Northern Naga forms is the ‘hand’ morpheme shown in Table 6. Hence, the full ‘finger’ words are Tiwa /ja-sí/, Atong B /caksi/, etc. The full Sak form is /aʔ ʃiʔ/, where the first morpheme may be a fossilized form of ‘hand’; the extant Sak lexeme ‘hand’ is /təhu/ (STEDT). Outside of Sal, compounds of PTB *lak-*(t)si are not common, although it is found in Northern Loloish, as in Yi (Mojiang) /lɛ̱^{21} tsi^{55}/ ‘finger’. Thus, the Sal languages show a shared characteristic ‘finger’ compound, but it is clearly a shared innovation.

Table 10. ‘Sambar deer’ cognates

Bodo-Garo		Northern Naga		Jingpho-Asakian		Other ST	
*ma-tʃok (jpe)		*gyuk				*d-yuk (2794)	
Garo	mat cok	Konyak	tok	Jingpho	kʰjì-dút	P-Kuki Chin	*ʃa-juk
Atong B	ma tʃok	Nocte	cok	Sak	kəjuʔ	Tawrã	mɑ^{31} tɕu^{53}
Dimasa	mo so	Wancho	cok				
Dimasa	m-saj [a]	Phom	ʃok				
Deuri	me si	Chang	sak				
Koch	mɑktʃɔk						

a. Evans & Langthasa (2024).

The Bodo-Garo /mV/ morphemes are an animal formative: Dimasa /m-sep/ ‘buffalo’, /m-zo/ ‘rat’, etc., (Evans & Langthasa 2024; cf. also Table 14, Table 19). French associates the Northern-Naga ‘sambar’ forms with the cited PTB proto-form. Matisoff connects the first syllable of the Jingpho form with *d-key ‘muntjac’ (STEDT #2313), and proposes the Proto-Jingpho-Asakian *-ut rime for the Jingpho second syllable (Matisoff 2013). It is likely that more cognates would be found if the semantics were broadened; e.g., Gurung /gjuu/ ‘sheep’ (French 1983: 541). ‘Sambar’ is another cognate set that shows neither shared innovation nor shared retention at the Sal level.

Table 11. ‘Cooking pot’ cognates

Bodo-Garo		**Northern Naga**		**Jingpho-Asakian**		**Other ST**	
*tɯk; *dək		*ʔ-dik				*mʔ-dikŋ (5786)	
Boro	dəʔ	Konyak	tük	Jingpho	tiʔ^{31}	Muya	di^{53}
Garo	dik	Nocte	tik	Sak	tiʔ	Old Chinese	*tˤeŋʔ
Atong	dək	Tangsa	koti-cik	Ganan	tejʔ-s^{h}i	Mandarin	*dīng*, 鼎
Rabha	tɯ́k			Kadu	tejʔ-ɕi		
Koch	mutuk						

‘Cooking pot’ appears to be inherited from a general Sino-Tibetan form. The Sal forms suggest that the parent form was non-prefixed, with *-k ending; Jingpho-Asakian final /-ʔ/ often descends from *-k (Matisoff 2013). The Chinese form reflects a *-ŋ allofam.

Table 12. ‘Sky/rain’ cognates

Bodo-Garo ‘sky’		**Northern Naga**		**Jingpho-Asakian ‘rain’**		**Other ST ‘rain’**	
*raŋ^{4}; *k-raŋ (jpe)		*rəŋ ‘sky’				*ms-raŋ (3571)	
Boro	no-k^{h}raŋ	Yogli	hr̥aŋ	Jingpho	mǎ^{31}ʒaŋ^{33}	Maram	tiŋ maraŋ a baŋ ’rainbow’
Garo	raŋ-ra	Moshang	roŋ	Sak	hráŋ	Old Chinese	*rˤeŋ
Atong B	raŋ ra	Nocte	raŋ			Mandarin	*líng* 零 ‘rain’
Tiwa	raŋ-ká-raŋ	Wancho	raŋ				
Rabha	raŋ	Konyak	waŋ				
Koch	ɾaŋ ‘rain’	Phom	vaŋ ʃo				
		Chang	loŋ				
		*raŋ ‘rain’					
		Moshang	raŋ				
		Chang	laŋ				

The semantics of the Bodo-Garo forms center around ‘sky’. The semantics center on ‘rain’ in Jingpho-Asakian and the extra-Sal ST examples. Northern Naga seems to show a transitional area that distinguishes two related morphemes, with ‘rain’ words descending from Proto-Northern Naga *raŋ, ultimately from the ‘sky’ morpheme (French 1983: 535). Moshang /raŋ/ ‘rain’ vs /roŋ/ ‘sky’, Chang /laŋ/ ‘rain’ vs /loŋ/ ‘sky’ validate the distinction (French 1983: 550). STEDT notes that Schuessler (2007; 2009: 361) observed the connection between the Chinese and Jingpho forms. French also suggests possible descent from PTB *m-raŋ ‘high’. However, as he observes, Moshang has /raŋ/ ‘high’ vs /roŋ/ ‘sky’, which would then need to be explained.

Table 13. ‘Bone’ cognates

Bodo-Garo		Northern Naga		Jingpho-Asakian		Other ST	
*kreŋ³; *greʔŋ		*raːŋ				*g-r(wy)a(ŋk) (238)	
Boro	b-geʔŋ	Konyak	wan	Jingpho	n³¹ʒa³³	PTani	*loŋ
Garo	greŋ	Nocte	a ra	Sak	áməra	WTibetan	*rus-krang* ‘skeleton’
Atong	g-reŋ	Tangsa	raŋ	Taman	raŋ	Kom Rem	ə ru ə rəŋ
Atong B	kreŋ	Moshang	a raŋ				
Wanang	k-reŋ	Wancho	ho ra				
Tiwa	kréŋ	Phom	vaŋ				
Rabha	kéŋ-dʒuŋ						
Koch	krɛŋ						
Dimasa L	b-grēŋ						

The Sal instances of ‘bone’ seem mostly to descend from the *g-raŋ form of the PTB ‘bone’ allofamic set. This etymon is widely attested across the Tibeto-Burman family; a few exemplars are recorded here. Matisoff says that the /ʒ-, r-/ initial forms in Jingpho and Nocte descend from a separate root, cognate with Written Tibetan *gra-ma* ‘fish bone’ (Matisoff 2013). The Taman form is consistent with Bodo-Garo and Northern Naga reflexes, suggesting that it descends from the PTB form cited here.

Table 14. ‘Tiger’ cognates

Bodo-Garo		Northern Naga		Jingpho-Asakian		Other ST
*mV⁴-ʃa		*C-gjaᴮ				*k-la
Boro	mo-sa	Yogli	ca	Sak	kə sa	(see below)
Garo	mat-ca	Moshang	ca	Kadu	kasà	
Atong B	mat sa	Nocte	sa			
Koch	mɑsɑ	Wancho	ca ɲu			
Dimasa L	mīʃī	Konyak	ʃa ɲu			
		Cham	saw ɲu			

The first syllable of the Bodo-Garo ‘tiger’ forms is an animal prefix, as seen in Dimasa: /m-si/ ‘tiger’, /m-sɾoŋ/ ‘fox’, /m-saj/ ‘deer’, /m-sep/ ‘buffalo’, /m-zo/ ‘rat’ (Evans & Langthasa 2024; cf. Table 10, Table 19). Additional morphemes to exclude from comparison are the second morphemes of the Northern Naga disyllable: /ɲu/ descends from Northern Naga *ɲəw ‘big’ (French 1983: 458). Matisoff observes that the initial half syllable of Jingpho /ʃã^{31} ʒo^{33}/ (not shown above), despite its *prima facie* resemblance to the Bodo-Garo and Northern Naga forms, consists of the ‘animal prefix’ < PTB *sya-n (STEDT #34). The second syllable of the Jingpho form descends from PTB *roŋ ‘wildcat’ (Matisoff 2013: 45). The comparanda then are the voiceless affricate- and fricative-initial syllables of Bodo-Garo, Northern Naga, and Asakian. Despite the similarities, there is no reason to assume that ‘tiger’ is a shared lexical innovation at the Sal level. ‘Tiger’ is a well-known *Wanderwort* of Southeast Asia. French himself did not think the Northern Naga forms were autochthonous, but saw parallels with:

> “Burmese-Lolo *(k-)la (WB kjà), which Benedict identifes as “ultimately a loan from Austro-Asiatic *k(u)la” (STC 177–178, n. 472); the Khasi is /u-kla/. This is probably also the source of the Northern Naga form, with the development of medial -j- < *-l- paralleled in Burmese, and Northern Naga *C- < PTB *s- ‘animal prefix’.” (French 1983: 569, lightly edited for clarity)

In summary, there is no innovative ‘tiger’ root shared by Bodo-Garo, Northern Naga, and Jingpho-Asakian.

‘Tree’ is treated in Burling (1983) as a single entry. However, Joseph & Burling (2006) and Burling (1959) reconstruct two ‘tree’ roots which are represented accordingly here.

Table 15. ‘Tree 1’ cognates

Bodo-Garo		**Northern Naga**	
*pol;*bVl		*pul	
Boro	bon ‘firewood’	Tangsa	pul
Garo	bol	Yogli	pul tʃoŋ
Atong	ban	Chang	pu
Wanang	pan	Phom	bʌ^{55}
Jingpho-Asakian		**Other ST**	
		*(pb)ul (2176)	
Jingpho	p^{h}un^{55}	PKuki-Chin	*ɓul ‘stump/ base’
Kadu	p^{h}ón	P-Tangkhu-lic	*pal
Sak	púŋ-láʔ ‘bark’	Old Chinese	*C.p^{ʕ}ənʔ 本
		Mandarin	*běn*

‘Tree 1’ descends from PTB *(b/p)ul ‘stump, tree’, with cognates in many branches of Sino-Tibetan, as well as reflexes in all three Sal language groups.

Table 16. ‘Tree 2’ cognates

Bodo-Garo		Northern Naga		Jingpho-Asakian		Other ST	
*pʰaŋ; *(p)iʔ-paʔŋ		*baŋ				P Loloish	*baŋ² [a]
Garo	bi-paŋ	Nocte	baŋ	Sak	apʰáŋ	W Burmese	tθɑs⁴ pɑŋ²
Dimasa	bu-paŋ, boŋ-paŋ	Wancho	pan			Khoirao	siŋ baŋ
Tiwa	páŋ						
Koch	pɑŋ						

a. Bradley (1979).

The second syllable of ‘tree 2’ has cognates elsewhere, including the Zemeic language Khoirao, and the Lolo-Burmese branch. Thus, the roots of ‘tree 1’ and ‘tree 2’ are general Sino-Tibetan etyma. Across Tibeto-Burman, in disyllables, ‘tree 2’ occurs as the second syllable.

Table 17. ‘Wife/woman’ cognates

Bodo-Garo		Northern Naga		Jingpho-Asakian		Other TB	
*dʒɯk, *mV²-cik;		*C-ciːk					
Garo	dʒik, meʔ-cik	Moshang	ja ʃik, ja ʈʃik	Andro	tīk-sɑ jɑhū	Mianchi Qiang	tɕé (tsì) mèi
Rabha	dʒɯk-saj, mí-cik	Nocte	de hiek	Ganan	jɑ¹ ʃi¹	Darma	ɕya , ci
Koch	mitʃik	Yogli	a ʃik			Tsangla	tshero ʔ
Dimasa L	-tʃik	Konyak	ʃeko			Motuo Menba	tshe roʔ
		Wancho	ʃiku			Yakha	a-mecha
						Guiqiong	gue³⁵ tɕhi³³
						Xumi	mɛ³³ tʂhɿ⁵³
						Sulong	a³³ ciɛ⁵³

The forms for ‘wife/woman’ are cognate across Bodo-Garo and Northern Naga (French 1983: 486), and Asakian. Cognate morphemes also appear in many other ST languages. There does not seem to be a proposed PTB or PST etymon.

Table 18. ‘Seed’ cognates

Bodo-Garo		**Northern Naga**		**Jingpho-Asakian**		**Other ST**	
*ca^{2}-lɯi; *c(aʔ)-li		*li				*li (3560)	
Boro	jɯ-lɯi	Konyak	ə li	Jingpho	li^{33}	Old Chinese	*lip* ‘grain of rice’
Atong	caʔ-ri	Nocte	k^{h}et a li			Mandarin	*lì* 粒
Wanang	ca-li	Tangsa	uli			PTani	*li
Rabha	cá-ri	Phom	ʃej li			Idu	lĩ
		Chang	li la			Zeme	he-laj
						Karbi	tʃ^{h}i li
						Tsangla (Motuo)	li^{13}
						Pumi (Taoba)	le^{35}
						Yi (Liangshan)	ɳ^{21}

In addition to support from Bodo-Garo, Northern Naga, and Asakian, cognate ‘seed’ words are found in Tani languages, as well as in the following families (representative languages only) Tawrã-Idu (Idu), Zemeic Naga (Zeme), Bodic (Tsangla), Qiangic (Pumi). The Chinese cognate is a provisional suggestion proposed by this author.

Table 19. ‘(Game) animal/meat/flesh’ cognates

Bodo-Garo		**Northern Naga**	
*ma^{4}; *mat		*meːj	
Boro	mɯ-, maj	Konyak	mej
Dimasa	mej; m-	Chang	mej
Garo	mat-bu-riŋ	Wancho	maj
Atong	mat		
Wanang	mat-a		
Tiwa	m-		
Rabha	má		
Deuri	me cu		

Table 19. *(continued)*

Jingpho-Asakian		Other ST	
Sak	*mey (39)	Angami	²the ⁴muo
		Liangmei	ka-mî
		Karbi	me sang 'langur'
		Chepang	mayʔ
		Old Chinese	*mr(ə)i [a] 'Pere David's deer'
		Mandarin	*mí* 麋
		Old Chinese	*mwəg [b] 脢
		Mandarin	*méi* 'meat along the spine' [c]

a. Schuessler (2007: 381).

b. Karlgren (1957: #947).

c. Schuessler (2009: 4).

Cognates of the 'animal/meat' words are rife throughout ST, including Chinese. Sample cognates are from Angami Naga group, Zemeic (Liangmai), Karbi, Himalayish (Chepang), and Chinese. In Bodo-Garo, reflexes of *mey occur as prefixes in animal names, as in Dimasa /m-/; cf. Table 10 and Table 14.

Table 20. 'Hold/take' cognates

Bodo-Garo		Northern Naga		Jingpho-Asakian		Other ST	
; *lawʔ		*C-la^{B}		*la (jpe)		*la-k (5056)	
Boro	lá	Nocte	la he	Jingpho	la^{55}	PKuki-Chin	*laː-I, *laːk-II
Kokborok	la	Wancho	la	Sak	la	Lepcha	bla
Deuri	la-	Konyak	ja				
Atong	rawʔ	Phom	ja²				
Wanang	ləw						

Reflexes of PTB *la-k 'hold/take' are widespread across the three sub-branches in question. It also occurs in Kuki-Chin languages and the Himalayish language Lepcha.

Table 21. 'Stomach' cognates

Bodo-Garo		**Northern Naga**	
*bwok (Joseph & Burling 2006)		*wuk	
Rabha	bok-dom	Yogli	vuk
Atong B	pi puk	Moshang	vak
Dimasa L	bōhō	Nocte	vok
		Wancho	vok
*Vk (Burling 1959)		Chang	ok si 'bowels'
Garo	ok		
Koch	ok, hɔk		
Wanang	ok		
Jingpho-Asakian		**Other ST**	
Jingpho	pù-hpam	*wuk (6723) *pʷu (2103)	
		Maring	uk
		PKaren	*ɣóʔ
		Old Chinese	*pjuwk 腹
		Mandarin	*fù* 'belly' [a]

a. I wish to thank a reviewer for point out this etymon.

The PTB reconstruction *wuk is one of many possible allofams of *d-(p/b)u-k (STEDT); the reflexes in Bodo-Garo and Northern Naga descend from forms with final *-k, and most with a labial initial, thus *bwok and *wuk. Bodo-Garo is further divided into two etymological sets, with Joseph & Burling (2006) proposing *bwok, and Burling (1959) suggesting *Vk. The first syllable of the Jingpho form, with a plain vowel rhyme, descends from an open syllable root, cited in STEDT as *pʷu. Cognates of this root are found in Kuki-Chin (Maring), Karenic, and Sinitic.

Table 22. 'Wolf/dhole/wild dog', etc., cognates

Bodo-Garo		**Northern Naga**	
N/A		*C-khjual	
Dimasa	si	Wancho	ʃan
Kokborok	ʃej	Konyak	ʃo
Garo	si:-ol	Phom	ʃo
		Chang	ʃo

Table 22. *(continued)*

Jingpho-Asakian		Other ST	
Jingpho	tʃa̱^{33}khjon^{33}	*s-k-ywal (6053)	
		Lushai	sihal
		Karbi	hi jai
		Newar	syāl
		Kman	kɑl^{33}
		PLolo-Burmese	*wan^{1}

The three subfamilies all have reflexes of the general TB root *s-k-ywal, as indicated by French (1983), Burling (1983) and Matisoff (2013). The root is widely attested in Chin (Lushai), Karbi, Newar, Deng (Kman) and Lolo-Burmese families.

2.3 Sets lacking Jingpho-Asakian cognates

The next seventeen sets have cognates in Bodo-Garo and Northern Naga, but not in Jingpho-Asakian.

Table 23. 'Drink' cognates

Bodo-Garo		Northern Naga		Other ST	
*lɯŋ^{1}; *ləŋ		*N-liːŋ			
Boro	ləŋ	Yogli	niŋ	PKuki-Chin	*in
Garo	riŋ-	Moshang	niŋ	Moyon	lń
Atong	rəŋ-	Wancho	liŋ		
Wanang	ləŋ-	Konyak	jiŋ	Sulung	rin^{33}
Tiwa	nûŋ-	Phom	jiŋ		
Rabha	rʊ̀ŋ-				
Koch	liŋ; ləŋ	*N-luːŋ			
Dimasa L	līŋ	Chang	juŋ		

French (1983) shows two allofams for Northern Naga, which are separated in the above set. Burling (1983) presents the "doubtful" Jingpho form /lùʔ/, which Matisoff (2013) rules out as not cognate. Extra-Sal cognates occur in other languages of the Northeast India area.

Table 24. ‘Wing’ cognates

Bodo-Garo		Northern Naga		Other ST	
*kraŋ[1]; *g-raŋ		*C/V-rəŋ (French 1983: 579)		*g-raŋ (720)	
Boro	gaʔŋ	Konyak	jaŋ	Kman (Miju)	ɹɑ̆u[53] ɹɑŋ[55]
Garo	graŋ	Nocte	a raŋ	Yimchungrü	keang
Atong	ga-raŋ	Moshang	wu roŋ	Tsangla (Tilang)	garaŋ
Atong B	karaŋ	Wancho	raŋ		
Wanang	ka-raŋ	Phom	jaŋ		
Tiwa	kráŋ				
Rabha	krèŋ				
Koch	kɑɾɑŋ				

Correspondence between Northern Naga and Bodo-Garo ‘wing’ forms was noticed by French (1983: 579). Although claimed as a support for a Sal meso-level, ‘wing’ cognates are widespread across TB, with a PTB reconstruction cited from STEDT. According to STEDT, the second syllables of Jingpho-Asakian forms descend from a similar etymon *k(w)aŋ (#240): Jingpho /sìŋ-kō/, Kadu /taí-kū/, Sak /ayáiŋ-ko/. The Jingpho form cited in Maran (n.d.) preserves the final nasal /sìŋ-koŋ/.

Table 25. ‘Boil/cook’ cognates

Bodo-Garo		Northern Naga	
*ʃoŋ[2]; *sVŋ		N/A	
Garo	soŋʔ	Chang C	tʰʊŋ[11]
Boro	saŋ	Khiamniungan C	a[33]-theŋ[11]
Tiwa	ʃóŋ	Nocte	soŋ-daŋ
Rabha	sóŋ	Tangsa	soŋ
Atong B	waʔ suŋ ‘bamboo cooking tube’		
Dimasa L	gəʃà		

Although Northern Naga ‘cook’ forms are from Burling (1983), French does not construct an etymological root for these. Proto-Kuki-Chin forms *tshuaŋ-I, *tshuan-II (STEDT) suggest cognates outside of Sal, although no higher-level reconstruction has been identified. Coupe (2012) connects these forms with PTB *tsyow ‘boil/burn/cook/bake’ (STEDT #2749), which seems to fit better with Jingpho /dʒu/, Dimasa /saw/, Garo /so/ ‘burn’. Evidence for this alignment includes the final nasal in the Bodo-Garo and Northern Naga forms in Table 24.

Table 26. ‘Face/forehead’ cognates

Bodo-Garo		Northern Naga		Other ST	
*mɯk-kʰaŋ; *m(u)-kaŋ		*kʰaŋ		*s-kawŋ ‘hollow (object)/ head’ (387)	
Boro	mɯ-kaŋ	Konyak	ʃakeŋ	Tangkhul	ki kaŋ
Garo	mik-kaŋ	Nocte	ǩʰaŋ	W Burmese	khɔŋ³
Tiwa	mo-kʰaŋ	Tangsa	kʰaŋ kaŋ	Ao	o¹-kaŋ³
Rabha	nú-kʰaŋ	Moshang	kʰaŋ	Tsangla	kʰar khaŋ ‘cheekbone’
Mech	mu-kʰaŋ	Yogli	kʰaŋ	Chepang	kwaŋ
Atong B	mə-kʰaŋ	Wancho	kʰaŋ ra		
Koch	məhuŋ	Chang	kʰeŋ ca		
		Khiam-niungan C	kha¹¹		

Words for ‘face/forehead’ in Bodo-Garo and Northern Naga descend from a form like *kaŋ or *kʰaŋ; the first morphemes in the Bodo-Garo compounds mean ‘eye’. Jingpho-Asakian lacks cognates, but numerous Sal-external Sino-Tibetan languages do show cognates; only a sample of more obvious supporting forms is provided in this set.

Table 27. ‘Insect/worm’ cognates

Bodo-Garo		Northern Naga		Other ST	
*joŋ²; *joʔŋ; *dʒoŋ (jpe)		*gluŋ		*s-lu(k/ŋ) (5432, provisional)	
Dimasa	juŋ	Konyak	joŋ	PKuki-Chin	*luŋ
Garo	dʒoʔ-oŋ, dʒoŋʔ	Nocte	maŋ doŋ	PLolo-Burmese	*k-luk ⤫ k-luŋ
Atong	coʔŋ	Tangsa	joŋ	PKarenic	*hloŋ^B
Wanang	coŋ	Wancho	coŋ	Old Chinese	*C.lruŋ
Rabha	cóŋ	Phom	loŋ tʰə	Mandarin	*chóng* 蟲
Koch	tʃɔŋ	Chang	jaŋ		
		Khiam-niungan C	suŋ¹¹		

The Northern Naga and Bodo-Garo forms have cognates in branches outside of Sal. The Jingpho word /ʃiŋ³³ ta̱i³³/ ‘insect/worm’, etc., does not appear to be cognate to forms in either of the other two groups (Matisoff 2013).

As noted in Burling (1959) and Burling (1983), ‘insect’ belongs to a group of sets where Northern Naga *gl- corresponds to Bodo-Garo *dʒ-/j- and Jingpho-Asakian *t-. These forms descend from PTB roots with initial *(C-)l-; cf. Table 28. The set ‘hand’-‘foot’-‘big 2’-‘insect’

shows quite regular correspondences across the initials (although Jingpho ‘foot’ may be problematic). Because all of the forms descend from PTB, the sets do not provide clear evidence for a Sal meso-level.

Table 28. Correspondence of Bodo-Garo *dʒ-, Northern Naga *gl-, Jingpho-Asakian *t-

	Bodo-Garo		**Northern Naga**		**Jingpho-Asakian**		**PTB**
‘hand’	PBG	*dʒak	PNN	*glək			*lak
	Rabha	cák	Konyak	jak	Jingpho	tạʔ^{55}	
	Atong B	cak	Nocte	dak	Kadu	tāk	
			Phom	lak	Chairel	lɑk	
‘foot’	PBG	*dʒaʔ	PNN	*gla^{A}			*la
	Rabha	cá-	Konyak	ja	Jingpho	lă^{31} ko^{33} (?)	
	Atong B	caʔ	Nocte	da	Kadu	ta	
			Phom	la	Sak	-ta	
‘big 2’	PBG	dʒuŋ (jpe)	PNN	*gluŋ	--	--	
	Rabha	cùŋ	Konyak	joŋ pu			
	Atong B	cuŋ	Nocte	a doŋ			
			Phom	loŋ pə			
‘insect’	PBG	*dʒoŋ (jpe)	PNN	*gluŋ			*s-lu(kŋ)
	Rabha	cóŋ	Konyak	joŋ	Jingpho	ʃĭŋ^{33} tại^{33}	
	Atong B	coʔŋ	Nocte	maŋ doŋ			
			Phom	loŋ tʰə			
‘moon’	PBG	*ja	PNN	*gla poj			*(s/g)-la
	Garo	ja-joŋ	Moshang	ja pi	Jingpho	ʃă^{33}tạ^{33}	
	Atong B	caŋ-; ja	Nocte	da	Kadu	səda	
					Sak	sədá	

Table 29. ‘Dry’ cognates

Bodo-Garo		**Northern Naga**		**Other ST**	
*ran^{2}; raʔn		*raːn			
Boro	g-raʔn	Konyak	wan	Karbi	kreŋ
Garo	raʔn-	Nocte	ran		
Atong	raʔn-	Khiamniungan C	uwanpu		
Wanang	ran-				
Tiwa	rán-, rân				
Rabha	rán-, ràn				
Koch	ɾɑn				

Bodo-Garo and Northern Naga languages have forms like *(r/w)an*. Matisoff (2013: 43) and STEDT propose a common Sal ancestor *g-ran (#7198). The Karbi form is very similar to the

Bodo-Garo forms, suggesting the possibility of a non-Sal origin. According to STEDT, Jingpho /lām/ and Sak /məláŋ/ descend from a different root, *s-la(m/p) (#3515). Thus, Bodo-Garo and Northern Naga show a different etymological root from Jingpho-Asakian, with an extra-Sal cognate.

Table 30. 'House' cognates

Bodo-Garo		Northern Naga		Other ST	
*nok; *nok					
Boro	noʔ	Konyak	nok	Batang	n̥oʔ^{53} 'be in the house'
Garo	nok			Guiqiong	nɔ̃^{31} 'be in the house'
Atong	nok				
Wanang	nok				
Tiwa	nó				
Rabha	nók				
Dimasa	noʔ				
Kokborok	noʔ				
Koch	nɔk				

Bodo-Garo *nok is a solid root for that group, with a cognate in Konyak. French (1983) reconstructs Proto Northern Naga *kium, which fits other Northern Naga languages: Yogli /him/, Moshang /jim/, Nocte /hum/, Wancho /ham/, Phom /ʃem/, Chang /cam/. Possible cognates of Bodo-Garo/Konyak *nok that are found outside of Sal have the meaning 'be in the house'. There is no Jingpho-Asakian cognate of either of the two protoforms represented by Bodo-Garo and Northern Naga.

Table 31. 'Bark (v.)' cognates

Bodo-Garo		Northern Naga		Other ST	
--		--		*zu(k/ŋ) (1792)	
Garo	a-cak 'dog'	Nocte	tʃʰok	Tshangla (Motuo)	suk^{13}, zuk
		Tangsa	ˡso(ʔ)	W Tibetan	*zug*
				Gurung	cʰuq ba
				Hani	tse̱^{31} [a]

a. Tentative, per STEDT.

For 'bark', Burling (1983) offers support from Nocte 'bark' and Garo 'dog', which might be considered speculative. There are no Jingpho-Asakian cognates. STEDT reconstructs a general

PTB etymon, and reflexes are found, for example, in Bodic (Tshangla, WTibetan), Tamangic (Gurung), and possibly Loloish (Hani).

Table 32. 'Big 1' cognates

Bodo-Garo		Northern Naga		Other ST
*dVr^2;				PKarenic *do^2
Boro	dér	Tangsa	adil	
Garo	dalʔ			
Tiwa	tór-			
Dimasa	g-de			
Koch	gɔ-da			

Table 33. 'Big 2' cognates

Bodo-Garo		Northern Naga	
*dʒuŋ (jpe)		*gluŋ	
Atong B	cuŋ	Yogli	a dʒuŋ
Rabha	cùŋ	Nocte	a doŋ
		Khaling	doŋ 'broad'
		Wancho	coŋ
		Konyak	joŋ pu
		Phom	loŋ pə
		Cham	jaŋ bu

'Big 1' is mostly attested in Bodo-Garo, but appears to have one cognate in Northern Naga; the Tangsa and Garo forms are similar. We also note a likely cognate in Proto-Karenic. On the other hand, 'big 2' is more widely attested in Northern Naga. The *gl- of Northern Naga corresponds to initial palatals in Atong and Rabha in other sets ('hand' (6), 'foot' (7), 'insect' (27)). No Jingpho-Asakian cognate has been found.

Table 34. 'Bite 1' cognates

Bodo-Garo		Northern Naga		Other ST	
*gak (Burling 1959)		*gək		*k(w)ak (755)	
Atong	gak-	Nocte	kak	PAo	*m-kak
Wanang	kak-	Tangsa	kok	Tujia	ka^{35}
Rabha	kák	Moshang	kok	W Burmese	*kuik*
Koch	kɑk	Nocte	kak	PLoloish	*C-kuk^{L}

Table 35. ‘Bite 2’ cognates

Bodo-Garo		Northern Naga		Other ST	
*cik (Joseph & Burling 2006)				*kyak (755)	
Garo	tʃʰik	Phom	ʃak ‘tear’	PKiranti	*kek
Tiwa	tʃĭ-	Chang	tak		

The first set of ‘bite’ words reflects PTB allofam(s) without medial *-y-. The second set shows evidence of medial *-y- inducing palatalization in Garo, Tiwa, Phom and Chang. Both Bodo-Garo and Northern Naga forms descend from a well-attested PTB root, with reflexes in numerous branches of the family, but without Jingpho-Asakian attestation thus far.

Table 36. ‘Come/go’ cognates

Bodo-Garo		Northern Naga		Other ST	
*pʰVV¹; pəj		*paːj ‘come, stand, lift’		*pay (446)	
Boro	pəj, pù̀j	Konyak	pej	PNorthern Chin	*paaj
Atong	ɸəj-	Chang	paj	Xumi	bi³⁵
Tiwa	pʰôj, pʰi	Phom	pej	Naxi	bɯ³³
Rabha	pʰoj-				
Dimasa L	pʰaj				
Koch	pʰuj				

Cognates of PTB *pay ‘come/go’ occur in multiple branches, including Northern Chin, Qiangic (Xumi) and Naxi. No reflexes have been found yet in Jingpho-Asakian. The Joseph & Burling’s (2006) reconstruction for PBG, with aspirated voiceless initial may be over-transcribed. Nearly all BG languages have only a two-way voicing/aspiration distinction, which may be simply represented as a voiced/ voiceless opposition.

Table 37. ‘Mat 1’ cognates

Bodo-Garo		Northern Naga		Other ST	
*am¹;		*klem		*hyam (3532)	
Boro	èm	Nocte	ham	Sema	a je pʰu
Dimasa	jam-	Konyak	əm	Ukhrul	kə-hɐm
Kokborok	jam	Chang	am ɲu		
Garo	am	Phom	am⁵⁵		
Tiwa	âm				
Deuri	am su				

Table 38. ‘Mat 2’ cognates

Bodo-Garo		Northern Naga	
*dam (jpe)		*dam (jpe)	
Atong B	dam	Moshang	dam
Rabha	dàm	Wancho	dam
Koch	dam	Tangsa	dam

‘Mat 1’ looks like a solid set of reflexes of PTB *hyam. This etymon is identified by STEDT as having reflexes in Bodo-Garo, Northern Naga, Angami (Sema) and Tangkhulic (Ukhrul) languages, making it a regional TB word, as all of these languages are in the Northeast India language area, but belong to separate branches. However, ‘mat 2’ forms, despite being included within ‘mat 1’ by the relevant authors, looks to be a recent borrowing, due to the nearly identical forms across Bodo-Garo and Northern Naga.

Table 39. ‘Nose’ cognates

Bodo-Garo		Northern Naga		Other ST	
*kuŋ^{1}-tuŋ; *gVʔŋ-tVʔŋ		*na-guːŋ		*(k/g)ywaŋ (809)	
Atong	na-k^{h}uŋ	Wancho	na kuŋ	Milang	nu-kuŋ-a-ruŋ
Koch	nɑkuŋ	Konyak	na teŋ	Chinbok	hŋa-kɔŋ
Boro	goʔn-toʔŋ	Yogli	k^{h}awŋ	Tengsa	tana ko
Dimasa	guŋ	Nocte	k^{h}o	Meithei	nə khaŋ
Kok-borok	bə=koŋ	Chang	kuŋ	WTibetan	*sna-khuŋ*, ‘nostril’
Garo	giŋ			Guiqiong	ŋ̩o^{55} kũ^{53}
Deuri	gu tũ				
Tiwa	kûŋ				
Rabha	kùŋ				

Some of the Sal forms (Atong, Koch, Wancho, Konyak) and all of the cited extra-Sal forms are compounds of two nose morphemes: PTB *s-na followed by *(k/g)ywaŋ. PTB *s-na (803) is the most widely attested ‘nose’ root (as in Jingpho /nə^{31}/), while *(k/g)ywaŋ appears to have meant ‘hole’ (the meaning of *khuŋ* in Written Tibetan). The compound is attested in a wide swath of subgroups: Tani (Milang), Kuki-Chin (Chinbok), Aoic (Tengsa), Bodic (Written Tibetan), and Qiangic (Guiqiong). The second member of the compound is not attested in Jingpho-Asakian.

The remaining Bodo-Garo and Northern Naga languages have generalized the second morpheme (‘hole’) to mean ‘nose’. Because both groups attest shared retention of the PTB

*compound, *‘hole’ > ‘nose’ appears to be a parallel development. No reflexes of PTB *(k/g)ywaŋ have been noted in Jingpho-Asakian.

2.4 Sets lacking Bodo-Garo cognates

Four sets have cognates in Northern Naga and Jingpho-Asakian, but not in Bodo-Garo.

Table 40. ‘Mother’ cognates

Northern Naga		Jingpho-Asakian		Other ST	
*ɲəːw				*n(y)u (1621)	
Konyak	a ɲu	Jingpho	kă^{31} nu^{31}	Hayu	nu nu
Nocte	taŋ ɲu	Sak	anứ	Lushai	nu la
Yogli	ɲaw				
Moshang	ɲu				
Wancho	a ɲu				
Phom	ɲə				

French suggests a relationship between the Northern Naga forms and PTB *s-nəw ‘breast, milk’. However, Matisoff (2003) reconstructs PTB *n(y)u ‘female, mother’, with various cognates external to the Sal group. Bodo-Garo lacks a cognate.

Table 41. ‘Bear (n.)’ cognates

Northern Naga		Jingpho-Asakian		Other ST	
*C-gjap					
Konyak	ʃap-ɲu	Jingpho	tsáp	Dulong	ɕɯi^{55}
Nocte	sap-ba	Kadu	kasát	Tujia	khu^{21} tɕhi^{21}
Tangsa	ʃap			Hani	xa^{31} ɔ^{55} (1st syll.)
Phom	ʃap^{33} daw^{55}			Naxi	gɣ^{21}
Wancho	tʃ^{h}ap				

Among the Sal languages, forms descending from *C-gjap, or its variant, are found in Northern Naga and Jingpho-Asakian. Across the ST family, most ‘bear’ words descend from *d-wam (STEDT #2777), including the second syllable of the Hani form cited here. However, the Northern Naga and Jingpho-Asakian forms listed here appear to be cognate to *C-gjap. Likewise, the Na and Naxi forms are good candidates for reflexes of this root. No cognates have been found in Bodo-Garo.

Table 42. ‘Garden/fence’ cognates

Northern Naga		Jingpho-Asakian		Other ST	
*pal ‘fence’					
Yogli	pal rik	Jingpho	n^{31} phan^{33}	Lushai	pal (French 1983)
Nocte	pan			Meithei	sam bal (French 1983)
Chang	pa			Old Chinese	*par 藩
*pəl ‘garden’				Mandarin	*fán* ‘fence’
Nocte	pan				
Konyak	pi ʃa				
Phom	pe				
Chang	ba				

The attested Bodo-Garo words for ‘garden/fence’, such as Boro /ba-ri/ appear to be borrowings from Indo-Aryan; cf., Assamese/Hindi *bagicha* and Bengali *bagan*. Assam has place names ending in -*bari*, such as *Jalukbari*, ‘chilli garden’ or ‘house of chilli’ (Dhrubajit Langthasa, pers. comm.), suggesting some time-depth for this *Wanderwort*.

Northern Naga has separate forms for ‘garden’ and ‘fence’ in most languages. French (1983: 487) treats *pal ‘fence’ as cognate with Lushai /pal/ and Meithei /sam bal/. Both the Northern Naga and Jingpho forms appear to be cognate with the Chinese forms.

Table 43. ‘New’ cognates

Northern Naga		Jingpho-Asakian		Other ST	
Nocte	anjan	Jingpho	nìŋ-nān	Chaudangsi	nũdə
Tangsa	anal	Sak	nájŋ	Raji	noŋ
Wancho	ho dʒan	Kadu	najá	Newar	nhu:
				Khaling	nin

The cognate for ‘new’ that is shared by Northern Naga and Jingpho-Asakian is not found in Bodo-Garo, and does not seem to have been reconstructed at the PTB level. However, cognates seem to be found in at least Western Himalayish (Chaudangsi, Raji), Newar, and Kiranti (Khaling).

2.5 Sets lacking Northern Naga cognates

The remaining three sets do not have forms in Northern Naga.

Table 44. 'Dive/sink' cognates

Bodo-Garo		Jingpho-Asakian		Other ST	
*r(i/ɯ)p;				*l(i/u)p (2407)	
Boro	tʰrup	Jingpho	lup^{31}	Lepcha	lap 'bury'
Dimasa	lip~lup			Limbu	lup-
Garo	srip			Achang	lo^{31}
Tiwa	ríp			Lisu	lɤʔ^{21}
Rabha	rʉ̀p				
Koch	tilup				

The 'dive/sink' etymon is best attested in Bodo-Garo with cognates in Jingpho, as well as throughout the ST family. Examples cited here are from Himalayish (Lepcha), Kiranti (Limbu), Burmish (Achang), and Loloish (Lisu). The extra-Sal cognates and the lack of Northern Naga forms cause this set to be non-supportive of a Sal hypothesis.

Table 45. 'Cover with cloth/wrap/put on and wear'

Bodo-Garo		Jingpho-Asakian		Other ST	
*phVn^{1};				*pun (2579)	
Boro	pìn	Jingpho	phun^{55}	PKuki-Chin	*puan
Garo	pin	Kadu	pʰūn	PCentral Naga	*m-p[a/ə]n

In the 'cover' set, cognates are found in Bodo-Garo, Jingpho-Asakian, and extra-Sal languages, but not in Northern Naga. In addition to the above reconstructions, Proto-Tani *pu 'wrap up in a bundle' might descend from this etymon (STEDT).

Table 46. 'Shake/move' cognates

Bodo-Garo		Jingpho-Asakian		Other ST	
*mao^{1};				*mow (2455)	
Boro	samaw	Jing-pho	ʃamawt; mu 'work (n.)'	Yi (Liangshan)	sɿ^{55} mu^{33}
Dimasa	ʃamaw	Sak	rəmʉ́	W Burmese	*mu*
Meche	maw			Anong	ə mu
Atong B	mot				

The Boro, Dimasa, and Jingpho forms show the *s- causative prefix; the Jingpho noun 'work' is just /mu/. The STEDT database shows that this morpheme, in the sense of 'work', shows up in many ST languages. Sample cognates are drawn from Nungic (Anong) and Lolo-Burmese (Written Burmese, Yi)

The final set cited in Matisoff (2013) as a good candidate for Sal support, 'vulture', is comprised of Garo /so-gin/ and Tangsa /skun/. However, these are Indo-Aryan loans; cf. Assamese /ʃakun/ and Bengali /ʃokun/ (borrowing noted in Jacquesson 2005).

As shown above, lexical innovation provides little support for a Sal grouping. There are only two or three forms, 'sun/day' (2), '(a)live, green' (3) and 'pestle' (4) that contain support in all three putative branches, and for which no Sal-external cognates have been identified. 'Rice (uncooked)' (5) provides support for a linkage between Bodo-Garo and Northern Naga. As cultural items, 'pestle' and 'rice' are easily borrowed words; cf. the borrowing of those words into English from French. Whether 'day/sun' is a Sal-level innovation is controversial, although favored in the present analysis.

As mentioned in the introduction, one of Burling's desiderata for settling the validity of the Sal hypothesis was "a detailed understanding of the phonological correspondences among the languages" (Burling 1983: 2). One example can be seen in Table 28. Ideally, subgroup-defining sound laws would derive from shared innovative lexica, because shared retentions do not provide evidence for "a period of common innovation" (Burling 1983: 2). About 130 Sal-level cognates have been proposed (Burling 1983). Some of them are erroneous (e.g., borrowings from Indo-Aryan). About ninety cognate sets were ruled out as descending from PTB (Matisoff 2013). Further analysis of the remaining sets identified PTB roots for most of them (above), leaving the sets represented in Table 47 as the most likely candidates for Sal-level innovation.

Table 47. Subgroup-level forms for apparent shared innovative lexica

Gloss	Proto-Bodo-Garo	Northern Naga	Jingpho-Asakian	Table #
'sun/day'	*sal	*cəl	Jingpho /ʈʃan^{33}/	2
'(a)live/ green'	*taŋ	*t(o/u)ŋ	Sak /túŋ/	3
'pestle'	*mol ~ *man	*mol ~ *man	PJA *mu(n/ŋ)	4
'rice (uncooked)'	*majʔ-roŋ	*C-wuŋ	--	5

As Table 47 shows, teasing out non-trivial innovative sound correspondences across these languages is a tricky endeavor. For the majority of cognates, establishing sound correspondences does not bolster the Sal hypothesis, because it merely solidifies shared retention.

The next section evaluates whether shared morphological innovation can aid in the validation of the Sal hypothesis.

3. Morphological evidence for the Sal hypothesis

The constituency of the Bodo-Garo group has been determined through identifying morphosyntactic innovations in the noun phrase and verb phrase (e.g., Wood 2008; 2011). Similar approaches have contributed to our understanding of Northern Naga (Morey 2018; van Dam & Muheim 2023). The relationship between Jingpho and Asakian languages is supported by shared phonological innovations, such as the fate of certain rhymes, morphology of 'eat'/'food'/'cooked rice', and shared lexical items (Matisoff 2013).

At a higher level, DeLancey (2011) and van Dam & Muheim (2023) both use comparative pronominal morphology to more precisely reconstruct relationships among certain Sal languages. DeLancey (2011) notes highly specific and typologically unusual hierarchical agreement systems shared by Nocte (Northern Naga) and Jingpho. For example, both languages have speech act participant-based agreement, marked with nearly-identical morphemes. The thesis is that this type of system should reconstruct to a Proto-Sal stage. Bodo-Garo languages are morphologically reduced, due to the creolization they have undergone (DeLancey 2014); no cognates to the system are found in Bodo-Garo. In fact, DeLancey (2014) claims that Bodo-Garo is the most thoroughly creolized and mixed sub-branch in ST (cf. Post 2022). Bodo-Garo is characterized by extreme creoloid grammar. For example, Bodo-Garo verbs tend to have very little paradigmatic morphology, with parts of the Tense-Aspect-Mood-Evidentiality system being expressed through serial verb constructions. Thus, it is not possible to find highly specific morphological correspondence between Northern Naga & Jingpho-Asakian and the Bodo-Garo branch, and DeLancey's (2011) test is only probative for Nocte/Northern Naga and Jingpho/Jingpho-Asakian. It is also worth noting that Nocte and Singpho (Jingphoic) speakers live in the same Tirap District, and morphological convergence may have occurred through contact.

In a similar vein, van Dam & Muheim (2023) evaluated whether a Proto-Sal pronominal system can be reconstructed. Although there are some common morphemes across the group, features like clusivity and dual plural are only reconstructible to any convincing degree in Proto-Northern-Naga.

Summarizing the findings of DeLancey and van Dam & Muheim, it is possible to reconstruct some shared morphological innovations among subsets of "Sal" languages. However, discovering ancient patterns shared by certain member languages is not the same as defining the

subgroup itself. In particular, although numerous scholars have identified a closer relationship between Northern Naga and Bodo-Garo (cf. §1), the types of tests used in the recent studies do not seem to work well with Bodo-Garo data.

Of additional concern is that in this area of the world, even typologically unusual features can be borrowed. For example, the morphosyntactic order *classifier numeral* is highly unusual. Outside of Southeast Asia, it is only documented in two Amazonian languages that only have a few numbers. However, for many ST languages of Northeast India, this highly atypical order is the norm (Evans 2022a; 2022b). It appears to have spread from Tai languages, where when specifying 'one (noun)', the classifier precedes the numeral. Thus, even shared highly unusual morphosyntactic properties does not constitute unassailable evidence of shared innovation.

4. Discussion and proposal

After weighing the evidence for various proposed linguistic relationships with Jingpho, Matisoff (2013: 41) writes:

"Working on this paper has brought home to me with particular clarity the utter crudeness of the traditional family-tree model of linguistic relationships, especially in a complex contact area like Southeast Asia. We are sorely in need of a new sort of diagrammatic representation…"

Taking the tree model of Figure 1 as a starting point, we may observe at least three weaknesses with the *Stammbaum* approach to language relatedness, especially in the context of Mainland Southeast Asia.

A line is a line. Not to be overly tautologous, but tree structures consist of lines. In many cases, language group bifurcations are well established. For example, a tree that divides Lolo-Burmese into Loloish and Burmish branches would be non-controversial, other than its nomenclature. However, in much of Sino-Tibetan, tree structures are tentative, or controversial. For example, the placement of Mruic within Tibeto-Burman has undergone multiple analyses. Shafer (1955) placed Mruic as a sub-branch of Burmic, with which Löffler (1966) agrees. Bradley (1997) asserts that its exact position is not certain, and acknowledges that others think Mru is a Kuki-Chin language; however, Peterson (2017) shows that Mru lacks the defining shared innovations of Kuki-Chin; e.g., verb stem alternation. Peterson (2009) asserts that Mruic is a TB branch that shares a higher node with Bodo-Garo, and perhaps Sal, based on morphological similarities with Bodo-Garo. At this time, any line connecting Mruic to a point

on the TB tree represents a perspective on language data that is more controversial than lines joining Loloish and Burmish. Nevertheless, the same indicator, a line, is used in both cases.

The basis of the line is not manifest to the reader. Related to the above point, a tree diagram presents the conclusions of an author's analysis. Hopefully, that analysis is contained in prose somewhere accessible to the reader or is otherwise made explicit. However, the reasoning and evidence are not part and parcel of the diagram. The subgrouping value of certain features, such as pronominalized marking on verbs, are controversial in Sino-Tibetan linguistics. If a controversial analysis is the basis for a line on the chart, the reader would benefit from awareness of the analysis.

The tree metaphor does not always fit reality. As noted above by Matisoff (2013), speakers of ST languages have been engaging in "complex contact" for millennia. DeLancey (2011; 2014) details how the structure of Bodo-Garo languages has become heavily creolized, due to the languages' social context over the past dozen centuries or more. Kurabe (2021) sheds light on how some of this intense context occurs on a micro-level. Within Kachin society, multiple languages are spoken. Exogamous marriage requires a husband and wife to come from different clans. It is typical that the husband and wife each retain his/her native tongue when speaking to the other, thus creating a sort of household-level creole environment.

In response to problems with tree models, van Driem (2011) proposes a highly agnostic "fallen leaves" model, in which there are no connecting lines between low-level subfamilies (Figure 2). In this figure "Brahmaputran" includes the Sal languages. This approach to the structure (or lack thereof) of the family offers several benefits.

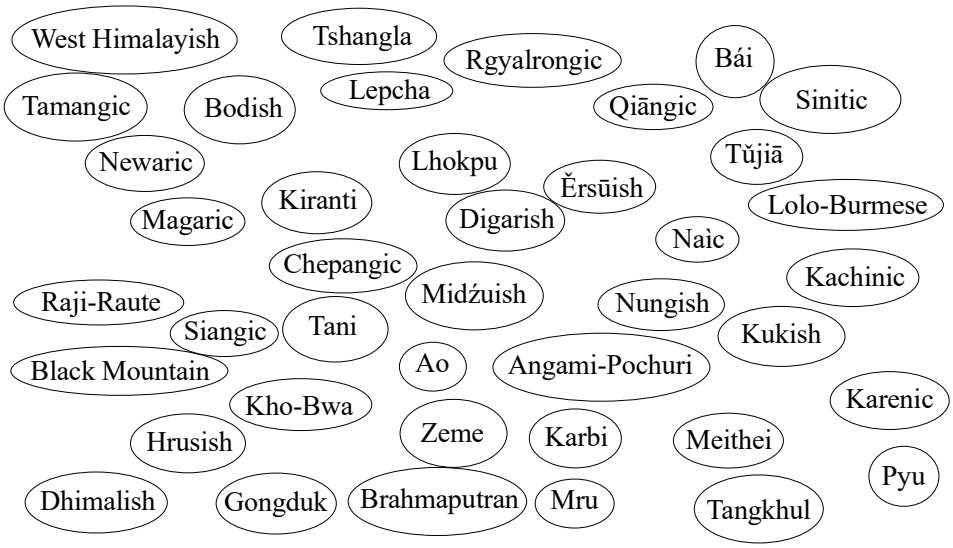

Figure 2. "Fallen leaves" model of Trans-Himalayan (Sino-Tibetan) (van Driem 2011: 37)

First, by definition, *it draws no erroneous lines*. By treating each subgroup as a distinct entity, no false levels of higher order are created.

Second, *it allows for multiple modes of transmission*. The tree model is a metaphor for genetic or genealogical transmission of language across time. However, the fallen leaves approach communicates that influences may be expected from multiple directions.

Nevertheless, there are certain inherent weaknesses in the fallen leaves approach.

First, linguists are not completely lacking in *gnosis*. For example, the hyphen in the "Lolo-Burmese" leaf in Figure 2 obscures a vast body of literature that details the split into Loloish, Burmish, and thence into finer divisions, many of which are well-established. Some leaves fall to the forest floor in attached clumps, and ignoring pre-existing knowledge does not create new insights.

Second, although the model allows for influence between groups, perhaps suggested by physical adjacency, these influences are not explicitly encoded in the model. Of course, this weakness also applies to the traditional tree approach.

Third, it does not distinguish vertical vs horizontal transmission. Linguists typically think of Qiangic and Rgyalrongic (and perhaps Ersuish) as sharing a historical node. Thus, we expect certain similarities in their member languages (like cognate forms for 'urine') that are more likely due to common inheritance than to contact. Some Qiangic languages, such as Northern Qiang have been in longstanding contact with Rgyalrongic, and show phonological convergence or

shared retention, such as complex onset clusters. However, Southern Qiang, under intense contact with Southwest Mandarin has phonologically converged to resemble Southwest Mandarin.

It appears that the field of historical linguistics needs an approach to modeling language relationships that avoids the excesses of false precision (trees) as well as needless imprecision (fallen leaves). I wish here to make a few suggestions that might yield a more informative visual representation of relationships among languages. The goal is to represent different ways that languages interact, and to provide the reader with the evidence that has been used to decide on putative relationships. I tentatively call it a "cloudy tree" model.

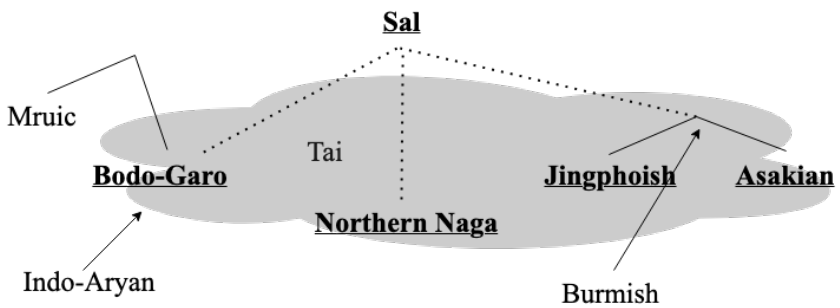

Figure 3. Cloudy Tree model of Sal languages

Legend:

Line style	Dotted lines represent less well-argued connections than solid lines do.
Northern Naga to Jingpho-Asakian	Nocte (Northern Naga) and Jingpho share unusual nominal verb morphology (DeLancey 2011).
Jingphoish to Asakian	Shared vocabulary; morphological relationships between eat/food/rice; similar rhyme innovations. Matisoff (2013).
Bodo-Garo to Sal	Shared lexica (Burling 1983; Matisoff 2013), but controversial and perhaps very few (Coupe 2012, in this paper).
Mruic to Bodo-Garo	Verbal and nominal morphology (Peterson 2009).
Tai cloud	Contribution of vocabulary, classifiers, sesquisyllabicity.
Indo-Aryan to Bodo Garo, Burmish to Jingpho-Asakian	Lexical influence through borrowing.

The "cloudy tree" representation in Figure 3 has the following properties:

1. Solid lines represent established genealogical relationships. For example, there are solid lines of descent connecting Northern Naga and Jingpho-Asakian through the Sal node.

2. Dotted lines represent tantalizing similarities. These connections are less certain, or indicate a more degraded inheritance. These languages may have changed in a way that the kind of data used to draw the solid line between Bodo-Garo and Mruic is not available. Witness the line connecting Bodo-Garo and the other language groups.
3. Arrows and clouds represent influence. Burmish and Indo-Aryan languages have their lexical influences. Tai has affected both phonological and grammatical structures across a swath of languages.
4. This kind of diagram helps to convey the areal properties of *lingua franca*. For example, arrows could be added from Jingpho to show it exerting a horizontal dominant influence on other languages on the tree, in addition to Asakian. This could be expressed by individual arrows, or by a cloud to show influence on multiple languages.

The cloudy tree representation can communicate more about each language connection than the tree and fallen leaf models do. It is not limited to representing languages under a shared ancestor. An integral part of the diagram is the accompanying documentation, which allows readers to draw their own conclusions. For example, Coupe (2012: 204) states:

"[It] is still arguably the case that eight lexical innovations constitute quite robust support for recognition of the Sal languages as a distinct branch of Tibeto-Burman, although the evidence for this must now be considered a little less compelling than was originally assumed when Burling's (1983) article first appeared."

By making the supporting claims explicit, the reader can see what the effect would be if certain supporting evidence were removed. For example, in the present model, if one rejects the lexical evidence for Bodo-Garo in the Sal group, then the figure could be re-drawn without the dashed line.

Despite the shaky ground on which a lexically-based Sal hypothesis stands, for the past 100+ years, the "Bodo-Nāgā-Kochin" grouping, along with its nomenclatural descendants, has served as a useful categorization for linguists. It is hoped that new linguistic information will enhance our understanding of relationships and influences among these languages. Perhaps by representing dynamic language relationships as a "cloudy tree", linguists can avoid the excesses of previous representations, and be able to better represent the linguistic forest through its trees.

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Language resources

Atong B	van Breugel (2014)
Chang C	Coupe (2012)
Chinese (old/middle)	Schueussler (2007; 2009); Baxter & Sagart (2011)
Dimasa	Longmailai (2014); Evans & Langthasa (2024)
Jingpho	If tone marks, then from Huang et al. (1992). If no tone marks, then from STEDT (Matisoff 2015)
Kadu	Sangdong (2012), Huziwara (2012; 2020)
Khiamniungan C	Coupe (2012)
Phom	Burling & Phom (1998)
PTB, etc.	STEDT (Matisoff 2015)
Sak	Huziwara (2012; 2020)
Wancho	Burling & Wangsu (1998)

Abbreviations

B59	Burling (1959)
B83	Burling (1983)
BG	Bodo-Garo
C12	Coupe (2012)
F83	French (1983)
JA	Jingpho-Asakian
JB06	Joseph & Burling (2006)
M13	Matisoff (2013)
NN	Northern Naga
PBG	Proto-Bodo-Garo
PJA	Proto-Jingpho-Asakian
PST	Proto-Sino-Tibetan
PTB	Proto-Tibeto-Burman
ST	Sino-Tibetan
STC	*Sino-Tibetan: A Conspectus*, by Benedict & Matisoff (1972)

STEDT *The Sino-Tibetan Etymological Dictionary and Thesaurus*
TB Tibeto-Burman

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語言深度接觸對形態句法的影響：三個四川的個案

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四川自古民族語言複雜，境內漢藏語豐富多樣，彼此在類型上存在明顯差異。本地區多語制普遍，語言之間長期的密切互動往往給語法體系帶來深遠的影響。本文依據第一手材料，探討三個本地漢藏語經由接觸影響發生形態句法演變的案例。參與互動的語言不同（藏↔嘉戎、嘉戎↔羌、霍爾↔藏），卻都在深度接觸下發生結構的趨同演變，除了引進新興的曲折形態與句法結構，甚至導致語法格局的改變。本研究顯示：闡釋本地區語言的語法演變，必須考慮複雜多元的語言接觸現象。

關鍵詞：四川漢藏語、語言接觸、語法演變、表層、附層、底層

1. 前言

語言長期雜糅相處、密切接觸的地區，除了詞彙及音韻特徵的滲透外，語法也常趨同發展，甚至導致結構類型產生轉變（Thomason & Kaufman 1988; Aikhenvald & Dixon 2006; Matras & Sakel 2007; Ross 2007; LaPolla 2009; DeLancey 2015; Poplack 2018）。

四川自古民族語言複雜，境內漢藏語豐富多樣，彼此在類型上有明顯的差異。長期存在的多語制，使相鄰的語種彼此影響，互動密切。本文討論四川漢藏語在深度接觸下改變形態句法結構的三個案例，除特別說明外，語料均由筆者研究團隊在四川調查蒐集。[1] 2.1 節探討在嘉戎語底層（substrate）影響下，藏語運用創新形態手段造成動詞過去詞幹。2.2 節探討僅有附層（adstrate）關係的嘉戎語與羌語密切接觸，嘉戎語在動詞人稱範疇及名詞格範疇受到羌語結構的滲透。2.3 節探討霍爾語在藏語的強勢表層（superstrate）影響下產生更深遠的結構改變，包括語法形式的借用與語法模式的套用。第 3 節總結全文討論，並對三個案例所揭示的語言現象提供進一步的觀察。

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1 本文取材自多年來調查蒐集的語料，均採音位標音方式。保守的嘉戎語組語言，動詞有詞幹交替現象，最多可區別第一（基式）、第二（過去）、第三（單數非過去及物）三個詞幹。不同的詞幹，本文以下加數字方式標誌。

2. 個案探討

2.1 嘉戎語影響藏語

色爾壩–杜科藏語（以下簡稱「色–杜藏語」）是一種新識別的特殊藏語（Sun 2023），其下至少有色爾壩（Gserskad）、杜科（Rdoskad）兩種差異明顯的方言。色爾壩方言分佈於甘孜州色達縣色曲河下游的旭日（Shelgrub）、楊各（Yangs'go）、甲學（Rgyashod）三鄉以及翁達（Sbomda'）鎮；[2] 杜科方言分布於阿壩州壤塘縣杜科河下游吾伊（Bugrje）鄉的卡龍（Khalung）村，[3] 以及崗木達（Rkamda'）鎮的崗木達、明達（Mesmda'）、章光（Bragmgo）三個村。

色達縣、壤塘縣的色–杜藏語均與嘉戎語接壤。[4] 色達縣色爾壩方言分佈最東端的甲學鎮，沿色曲河往下行便是操嘉戎語的歌樂沱鄉。[5] 壤塘縣杜科方言分佈最南端的吾伊鄉卡龍村，往南便是使用嘉戎語的吾伊鄉章臘、吾依、修卡村。[6] 色–杜藏語長期接觸嘉戎語，在詞彙及形態層面都可觀察到來自嘉戎語的接觸影響。

2.1.1 詞彙的影響

色–杜藏語有少量明顯與嘉戎語同源的特殊詞彙，涉及常用核心詞義，尤其是本土動植物名稱，應屬嘉戎語的底層詞，如下表所列：

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2 爐霍縣泥曲及鮮水河沿岸的藏語與色達縣色爾壩藏語相鄰，我們也發現有類似的語言特徵，其譜系地位尚待確定。

3 卡龍村現已與章臘村合併為松得村。

4 嘉戎語群屬於羌語支嘉戎語組（Sun 2000a, 2000b; Jacques 2017），內部包括四土、草登、脩梧（又稱「日部」）、茶堡四種獨立語言。壤塘縣的嘉戎語，當地稱為「大石溝話」，屬於脩梧嘉戎語的獨立方言。

5 甲學、歌樂沱二鄉現已合併為甲學鎮。

6 吾依鄉的語言情況複雜，西西村與壤古村八里小組使用口音近似南木達鄉的安多藏語。

表 1. 色–杜藏語中的嘉戎語底層詞

	色爾壩藏語	杜科藏語	脩梧嘉戎語
使用 [a]	ⁿtʃʰoŋ	ⁿtʃʰəŋ	ntʃʰɐ̄
弟弟	ɐʁe	aʁe	-ʁē 「弟妹」
腋下	qətsəʒap	tsəqəʒap	təqətsə́vje
小麥	（tʂu）	qa	qā
蕪菁	rɐle	rɐle	rʌlē
蝴蝶	pʰɐlbə	pʰalbə	pʰalbūm
蝙蝠	---	vervə	ʁʌvərvē
蚯蚓	（ⁿbərniɐ）	ʁaⁿdʒe	ʁɐⁿdʒē
橙翅噪眉	qʰala	qʰale	qʰʌlē
貓頭鷹	（əkpa）	pəku	pə́ku

a. 審查人之一提到，這個詞也可能源自藏語 *'chang* [PRS] / *bcangs* [PST] / *bcang* [FUT] / *chongs* [IMP]「抓握、帶、擁有」，是嘉戎語組的古藏借詞。這個論點值得參考，因為大致符合嘉戎語韻母的語音對應（四土嘉戎語 *ptʃô*，修梧嘉戎語 *ntʃʰɐ̄*，草登嘉戎語 *ntʃʰi* < **-aŋ*）；不過古藏語 *'chang*（及多數現代藏語的對應形式）並非「使用」的意思，語義上不吻合。此處的移借方向性還需進一步研究。

2.1.2 語法的滲透

古藏語動詞有詞幹交替現象。及物動詞最多區別四個不同的詞幹，傳統稱為「三時」(「現在」、「過去」、「未來」）與「一式」(「命令」）變化，例如 *'jog* [PRS]–*bzhag* [PST]–*gzhag* [FUT]–*zhog* [IMP]「放置」。現代藏語裡未來詞幹基本消失，[7] 而現在、過去、命令詞幹在安多、沙石多等方言裡保存較好，不少常用動詞還區別三種詞幹；而多數方言已大幅簡化詞幹交替，常以過去詞幹取代現在詞幹（Li 1933；Jäschke 1954；Chang Shefts & Chang 1982；瞿靄堂 1985；Zeisler 2009；Tournadre 2016），有些地方已基本沒有詞幹變化。[8] 色–杜藏語在這一方面獨樹一幟，動詞詞幹交替非但活躍，且擴展到古藏語無詞幹變化的動詞，尤其特別的是詞幹變化的創新。

7 部分方言中，殘存的古藏語未來詞幹轉為現在詞幹。例如從語音對應規律得知，色–杜藏語動詞「剪」的現在詞幹 *tʂa* 源自古藏語的未來詞幹 <dra>。

8 例如甘孜州稻城縣稻壩、貢嶺一帶的藏語，僅有「來」、「去」兩個動詞殘存詞幹變化（個人研究）。

色–杜藏語不少常用動詞與安多藏語一樣，須區分現在、過去、命令三種詞幹，請比較（詞幹變化以現在／過去／命令順序呈現）：[9]

表 2. 古藏語、安多藏語與色–杜藏語動詞詞幹變化比較

	古藏語	安多藏語	色–杜藏語
上（馱子）	'gel/bkal/khol	^{n}ge/ka/k^{h}u	pkal/pkel/k^{h}ol
殺死	gsod/bsad/sod	^{h}sol/sal/s^{h}ol	fsat/fset/sot
使斷（柔軟物）	gcod/bcad/chod	^{h}tʃol/tʃal/tʃ^{h}ol	ptʃat/ptʃet/tʃ^{h}ot

從語音對應規律可知，上表安多藏語動詞的現在、過去、命令形式直接反映古藏語的現在、過去、命令詞幹。色–杜藏語則不然：現在詞幹常反映古藏語過去詞幹，[10] 過去詞幹多與古藏語過去詞幹無承繼關係，而是在色–杜藏語現在詞幹基礎上，運用元音變音（ablaut）規律造出的新生形式：

表 3. 色–杜藏語動詞過去詞幹的變音模式 *a* → *e*

	現在詞幹	過去詞幹	變音模式
上（馱子）	pkal <bkal$_{[PST]}$>	pkel	a → e
殺死	fsat <bsad$_{[PST]}$>	fset	
弄斷（繩子）	ptʃat <bcad$_{[PST]}$>	ptʃet	

上表各例中，動詞現在詞幹的 *a* 變為創新過去詞幹的 *e*。事實上，色–杜藏語存在一整套的元音交替模式，其中色爾壩話與杜科話共用的部分如下表：[11]

9 安多藏語以甘南夏河話代表，引自華侃、龍博甲（1993）。

10 色–杜藏語動詞現在、命令詞幹的古藏語來源也較複雜，請參 Sun（2023: §4.3）。

11 色爾壩話及杜科話各自還有獨特的變音規律，請參 Sun（2023: 360, Table 16）。

表 4. 色–杜藏語動詞過去詞幹的變音模式總表

	現在詞幹	過去詞幹	變音模式
上（馱子）	pkal <bkal[PST]>	pkel	a → e
使混合	fsi <bsres[PST]>	fse	i → e
跳 [a]	mtʃʰu <mchong[PRS]>	mtʃʰe	u → e
煮（水）	fkol <bskol[PST]>	fkel	o → e
喝	ⁿtʰu <'thung[PRS]>	ⁿtʰi	u → i
點（火）	vdʐon <bsgron[PST]>	vdʐin	o → i
擦拭	ptʃə <†phyi> [b]	ptʃi	ə → i

a. 語例為色爾壩話；杜科話「跳」使用另一詞根 *ldəŋ* <lding>。
b. †符號沿用 Guillaume Jacques 的倡議，標註依對應規律推導出來，而一般藏文詞典未收錄的可能古語形式。

與色–杜藏語有密切地緣關係的脩梧嘉戎語中，類似的元音交替也是重要的動詞形態特徵。脩梧嘉戎語動詞可區別二至三種詞幹，即第一（基礎）、第二（過去）、及第三（單數及物非過去）詞幹；詞幹變化以多種音韻手段體現，其中之一便是元音交替。過去詞幹牽涉到的元音交替模式有下列 12 種（Sun 2004: §5）：

表 5. 脩梧嘉戎語動詞詞幹的變音模式總表

	現在詞幹	過去詞幹	變音模式
借入	rŋê	rŋî	ɐ → i
按壓	rbʌ̄	rbî	ʌ → i
殺	ntʃʰē	ntʃʰî	e → i
來	və̄	vî	ə → i
捶打	ɣdō	ɣdû	o → u
倒進	tə̄	tʰū	ə → u
拿	ⁿdê	ⁿdə̄	ɐ → ə
壓緊	ɣdî	ɣdə̄	i → ə
放牧	ɬtʰôɣ	ɬtʰə̄ɣ	o → ə
靠近	rnî	rnē	i → e

續上表

	現在詞幹	過去詞幹	變音模式
烹煮	sqɅ̄	sqʰɐ̄	ʌ → ɐ
加	zjû	zjō	u → o

比較表 4 可知，色–杜藏語元音交替的多樣性不如修梧嘉戎語。但二者的變音模式有重要的共同點。其一，變音導致元音中立化；色–杜藏語的元音一律變為前高元音 *i* 或 *e*，修梧嘉戎語也有較多元音變為前高元音 *i*。其二，修梧嘉戎語的變音模式涉及前高元音互換 *i* ⇌ *e*，同樣的現象也見於色–杜藏語的杜科方言：[12]

表 6. 脩梧嘉戎語與杜科藏語動詞詞幹變音模式 *i* ⇌ *e*

	詞義	現在詞幹	過去詞幹	變音模式
修梧嘉戎語	殺	ntʃʰē	ntʃʰî	e → i
	放置	fʃē	fʃî	
	靠近	rnî	rnē	i → e
	燒烤	səskî	səskʰē	
杜科藏語	趕（牛）	tet	tit	e → i
	拉	ⁿtʰen	ⁿtʰin	
	使混合	fsi	fse	i → e
	鋪	pti	pte	

其三，藏語有些動詞並無詞幹元音交替，借入修梧嘉戎語時也須依變音模式產生過去詞幹，例如源於藏語 <'drub/drubs/drub/drubs> 的 *tʃôv*（現在詞幹）→ *tʃə̃v*（過去詞幹）「縫紉」；源於藏語 <'khur/khur/khur/khur> 的 *fkôr*（現在詞幹）→ *'fkʰur*（過去詞幹）「揹」。

藏語在色達縣及壤塘縣都是優勢語言；相對於藏語，兩地的嘉戎語分佈窄、人口少，屬於語言活力趨弱的底層語言。上文 2.1.1 節所列的特殊詞彙，即為色–杜藏語殘留有嘉戎語底層的證據。色–杜藏語通過元音交替產生動詞過去詞幹的特殊形態創新，非但古

[12] 色–杜藏語的色爾壩方言（甲學鄉話）裡，古藏語 <ed>、<en> 韻已變為 /ɐt/、/ɐn/，因此不參與 *e* → *i* 變音模式。

藏語無跡可尋，其他方言也未見報導，極有可能也是嘉戎語底層影響的產物。亦即以本地雙語人為媒介，將嘉戎語元音變音新生詞幹的形態機制通過「比例類推」（four-part analogy）式引進色–杜藏語，造成新生的過去詞幹，如下圖：

表 7. 脩梧嘉戎語動詞詞幹元音交替模式

修梧嘉戎語		色–杜藏語	變音模式
$fʃ\tilde{e}_{[PRS]} \rightarrow fʃ\tilde{i}_{[PST]}$ 放置	=	$tet_{[PRS]} \rightarrow X_{[PST]}$ 趕（牛）	e → i
		X = tit	
$rn\hat{i}_{[PRS]} \rightarrow rn\bar{e}_{[PST]}$ 靠近	=	$pti_{[PRS]} \rightarrow X_{[PST]}$ 鋪	i → e
		X = pte	

2.2 羌語影響嘉戎語

黑水縣位於阿壩州中部，共有藏、羌、嘉戎三種本土語言。縣西黑水河上游的沙石多鎮，操藏、羌、嘉戎語的藏族沿河分佈，比鄰共存。沙石多鎮的馬河壩、銀真、甘市壩、奶子溝村使用沙石多藏語；[13] 楊柳秋村與甲足村使用特殊四土嘉戎語方言；兩村中間的羊茸村與昌德村使用西北部羌語蘆花方言。[14] 舊社會時，三種沙石多鎮的本土語言不分地位高下，上四村（藏語）與下四村（羌語及嘉戎語）之間僅能以「各說各話」進行有限的溝通，然而下四村民眾一般能流利使用羌語及嘉戎語。羌語及嘉戎語均無文字，二者在沙石多鎮屬於對等的附層（adstratum）關係。長期雙語制的結果，導致若干羌語的成份滲入沙石多嘉戎語的詞彙乃至語法結構。現以沙石多鄉甲足村嘉戎語（以下簡稱「甲足話」）為例，分別介紹於下。[15]

13 馬河壩、銀真、甘市壩三村現已合併為雅克夏村。

14 羌語是由多種互不通話的語言構成的語群，較早期文獻將無聲調的羌語籠統稱為「羌語北部方言」並不周延。僅在黑水縣就流通數種差別很大的羌語，其中蘆花鎮、卡龍鎮，及沙石多、紅岩、麻窩、知木林、扎窩、慈壩等鄉的羌語具有成套的小舌化元音等共同音韻特徵，同屬「西北部羌語」（孫天心、余文生 2013）。

15 甲足、昌德二村現已合併為昌德村。

2.2.1 詞彙的影響

甲足話詞彙中也有少量來自羌語的借詞，涉及身體部分、動植物、人事等常用名詞，例如：

表 8. 甲足嘉戎語的羌語借詞

	甲足話	羌語（麻窩話）
乳房	tə-papa	paᵏpaᵏ
黃鼬	tɕaqo	tʃaᵏqu
岩松鼠	rakəj	raki
蕨苔	moʁo	muᵏʁwə
瞎子	qətɕe	qətʃa
嬰兒	ɴaχə	ɲaᵏχwə

2.2.2 語法的滲透

甲足話的語法結構，也發現有疑似受羌語影響引進的形態創新，包括動詞主語型人稱模式，以及名詞接受者論元的與格標記。

2.2.2.1 動詞主語型人稱模式

嘉戎語群屬於嘉戎語組，本語群四土、草登、脩梧、茶堡四種語言都有類似的「人稱」範疇，以加詞綴方式，將語句論元登記於動詞之上（DeLancey 1981；瞿霭堂 1983；van Driem 1993；孫天心、石丹羅 2002；Jacques 2021）。以下以馬爾康市馬爾康鎮西索村的四土嘉戎語（林幼菁 2016；以下簡稱「西索話」）介紹嘉戎語的動詞人稱體系的運作（V 代表動詞詞幹）。表 9 是基本的人稱標記體系，使用於不及物情境，以及帶非屬人賓語的及物情境；表 10 是屬人主事與受事論元的及物情境：[16]

[16] 西索話第一、第二人稱單數主語，第三人稱單數賓語的及物情境，還須加及物後綴 -w（林幼菁 2016：24）。

表 9. 西索嘉戎語動詞的人稱標記

	第一人稱	第二人稱	第三人稱
單數	V-ŋ	tə-V-n [INTR]	V [INTR]
		tə-V-w [TR]	V-w [TR]
雙數	V-tʃ	tə-V-ntʃ	V-ntʃ
複數	V-j	tə-V-ɲ	V-ɲ

表 10. 西索嘉戎語屬人論元及物情境的人稱標記

	1 單	**1 雙**	**1 複**	**2 單**	**2 雙**	**2 複**	**3**
1 單				ta-V-n	ta-V-ntʃ	ta-V-ɲ	V-ŋ
1 雙							V-tʃ
1 複							V-j
2 單	kəw-V-ŋ	kəw-V-tʃ	kəw-V-j				tə-V-w
2 雙							tə-V-ntʃ
2 複							tə-V-ɲ
3 單	wə-V-ŋ	wə-V-tʃ	wə-V-j	tə-w-V-n	tə-w-V-ntʃ	tə-w-V-ɲ	V-w
3 雙							V-ntʃ
3 複							V-ɲ

觀察上表可知，嘉戎語以人稱標記反映語句論元時，並非選取固定的語法關係（如主語、賓語）或語意角色（如主事者、受事者），而是採用「分裂模式」，依據不同之言談語用情境，選取不同之論元（Ebert 1987）：

表 11. 嘉戎語分裂式動詞人稱體系選取之論元

互動情境	動詞登記之論元
內部互動（1⇌2）	賓語
外部互動（3⇌3）	S/A 主語
交錯互動（1/2⇌3）	對話參與者 1/2

嘉戎語人稱體系的運作須遵守「人稱認同等第」（1>2>3），違反等第順序的及物情境要加上反向前綴 *w(ə)-*；牽涉說話者與受話者內部互動的情境，動詞要加上特殊前綴 *ta-*（1→2）與 *kəw-*（2→1）。[17]

作為四土嘉戎語的特殊方言，甲足話動詞人稱標記系統乍看之下也與西索話相似，如下表：

表 12. 甲足嘉戎語動詞的人稱標記

	第一人稱	第二人稱	第三人稱
單數	V-ŋ	tə-V-n [INTR]	V [INTR]
		tə-V-w [TR]	V-w [TR]
雙數	V-ɛ	tə-V-nɛ	kə-V [INTR]
複數	V-j	tə-V-ɲ	wə-V [TR]

表 13. 甲足嘉戎語屬人論元及物情境的人稱標記

	1 單	**1 雙**	**1 複**	**2 單**	**2 雙**	**2 複**	3
1 單				ta-V-n	ta-V-nɛ	ta-V-ɲ	V-ŋ
1 雙							V-ɛ
1 複							V-j
2 單	kə-w-V-ŋ	kə-w-V-ɛ	kə-w-V-j				tə-V-w
2 雙	kə-w-V-ŋ-ɛ						tə-V-nɛ
2 複	kə-w-V-ŋ-ɲ						tə-V-ɲ
3 單	wə-V-ŋ	wə-V-ɛ	wə-V-j	tə-w-V-n	tə-w-V-nɛ	tə-w-V-ɲ	V-w
3 非單							wə-V

[17] 這兩個特殊人稱前綴是融合的形式。1→2 前綴 *ta-* 源自第二人稱標記 *tə-* 與正向前綴 *a-* 的結合；2→1 *kəw-* 源自 2→1 情境專用前綴 *kə-*（可能是第一人稱的古老形式）與反向前綴 *wə-* 的結合。2→1 情境專用前綴 *kə-* 草登嘉戎語也可替換為 *tə-*，而修梧（日部）嘉戎語僅能使用 *tə-*（Gong 2014: 56, Table 8）。

各地嘉戎語動詞的人稱範疇均採上述「分裂式」格局，僅在標記形式上略有差異。[18] 然而甲足話與眾不同，兼有「分裂型」、「S/A 主語型」兩種人稱標記模式，機制更為複雜。

具體來說，甲足話牽涉屬人主、賓語的及物句，加人稱標記時須依賓語受影響程度區分不同的情況。深度影響受事者的動詞（如接觸受事者身體的「打」、造成受事者狀況變化的「殺」、或明顯針對受事者的「追」、「騙」等）須採分裂式，如下例：

（1） *dʐo* *ta-top-nɕ* *na*
2DU 1→2-打-2DU DM
我要打你們兩個哦！

不顯著影響受事者的動詞（如感官動詞「看」、心理動詞「喜歡」等）可採分裂式（2a），也可自由交替為登記主語論元的主語式（2b）：

（2） a. *no* *ŋəⁿdʐe* *ko-kəw-mto-ŋɕ* *mə*
2SG 1DU PFV:EGO-2→1-看見-1DU Q
～ b. *no* *ŋəⁿdʐe* *ko-tə-mto-w* *mə*
2SG 1DU PFV:EGO-2-看見-TR Q
你看見我們兩個了嗎？

而對受事者不產生任何影響的動詞（如「認識」、「像」）只能選擇「主語式」（3a）：

（3） a. *no* *ŋa* ***tə-ɕi-w*** *mə*
2SG 1SG 2-認識-TR Q
*b. *no* *ŋa* ***kəw-ɕi-ŋ*** *mə*
2SG 1SG 2→1-認識-1SG Q
你認識我嗎？

[18] 甲足話主語為雙、複數第二人稱，賓語為第一人稱單數時，動詞須同時帶賓語（先）及主語（後）標記（參見孫天心 2015：§4.1）。

相較於嘉戎語，羌語及物動詞的人稱標記一律反映 S/A 主語論元：[19]

（4）a. ***kwənə*** *qaᵡ* *da-ze-**n***
2SG 1SG PFV-打-2SG
你打了我。

b. ***qaᵡ*** *kwənə* *kwə-tu-**a***
1SG 2SG PFV-看見-1SG
我看見了你。

c. ***kafi*** ***qaᵡ*** *du-ɣlu-**Ø***
扎西 1SG PFV-欺騙-3
扎西欺騙了我。

由此可見，甲足話動詞人稱形態的突出特點便是兼具嘉戎語的「分裂型」以及羌語的「主語型」。由於「分裂型」的外部互動情境，動詞其實也反映主語論元，甲足話的創新處在於將「主語型」動詞人稱延伸至及物性較低，賓語受影響較小的情境。這種「主語型」模式運用範圍的擴大增強，有可能源自羌語動詞人稱模式的滲透影響。

2.2.2.2 名詞的與格標記

帶「接受者」語意角色的論元，嘉戎語裡分兩種情況，論元結構並不相同。如以下草登嘉戎語「贈給」與「遞給」句例（Sun & Bstan’dzin Blogros 2019）：

（5）a. *qʰoʔ* *tsəɟəʔ* *rɟémtsɐn-ni* *qɐcʰwetriʔ* *lɐ-ɐre-tsə*
SEQ 1DU 人名-DU 嘎秋里 PFV:向上游-去 $_2$-1DU
qʰoʔ *tátwi* *o-ⁿboleʔ* *kə́mŋo* *jɐrmɐ* *nə-óɣ-ⁿbi-**jə***
SEQ 大隊 3SG:POSS-公黃牛 五 大約 PFV-INV-給 $_2$-1PL
我與堅贊上去了嘎秋里大隊，他們給了我們五頭隊上的公黃牛。
（文革的經歷）

[19] 黑水縣西爾鎮雲林寺村口語，本人田調語料。

b. *qə́jwi* *stʰoʔ* *kə-xtɛʔ=nəʔ*
饃饃 最 NMLZ:SBJ-大=DET
(ə́-pʰa) *lə́-kʰɛ/*ló-kʰi-aŋ*
（1SG:POSS-處所） IMP-遞 3／*IMP-遞 3-1SG
把最大的一塊饃饃遞給我！ （老婦人的兒子與兔子）

（5a）句的謂語是涉及所有權讓渡，影響接受者較深的「贈給」，接受者「我們」的句法地位為屬於核心論元的「主要賓語（primary object）」，依據交錯互動動詞登記對話參與者的原則，人稱標記 *-jə* 須出現在動詞之上。（5b）句的謂語是不涉及所有權讓渡的「遞給」，接受者「我」形式上是處所名詞的領屬者（字面上的意義是「我的處所／方向」），句法地位屬於周邊論元，動詞不能反映其人稱。換言之，嘉戎語的「接受者」一般體現為周邊論元，在特定的情況下才可表達為登記於動詞人稱的賓語論元。

甲足話的情況與此不同。甲足話動詞 *dət* 可兼表「遞給」（6a）與「贈給」（6b），兩種語義的接受者論元都須加格依附詞 =*ɕ*：[20]

（6）a. *ŋa=j* *pəntsə* *ŋa=ɕ* *kəw-dət-ŋ*
1SG-GEN 書 1SG=DAT 2→1-給-1SG
我的書遞給我！
b. *no=j* *ⁿbro* *ŋa=ɕ* *kəw-dət-ŋ*
2SG-GEN 馬 1SG=DAT 2→1-給-1SG
你的馬送給我！

格依附詞 =*ɕ* 在甲足話裡常標記周邊論元，表達「朝向（某處）」，如下例：

（7）*tʂimpa* *te=ɕ* *nana* *nə-rko-w* *nə-mɲot*
圍裙 一=ɕ 向下 PFV-裝-TR PFV-滿
他把（梨子）向下裝在一個圍裙裡，（圍裙）裝滿了。 （Pear story）

[20] 甲足話也有對應於草登嘉戎語 *ⁿbri*「贈給」的動詞 *wu*，但是意思是「給（東西）吃」。

然而，前例（6b）的接受者論元「我」帶有格標記 =ɞ，其人稱卻須登記於動詞 *dət* 之上。可見此處接受者「我」的句法地位是核心論元，而依附詞 =ɞ 呈現的是核心與格的用法。

嘉戎語屬於中心語加標（head-marking）的結構類型，接受者論元一般不出現與格旗標，取而代之的是帶人稱領屬前綴與處所格的「關係名詞」，例見西索話（改引自林幼菁 2016：20）：

（8）*kə-mtʂo* ***ɲɐ-ʃî=j*** *nɐrə* *tɐkɐj* *kə-ktê*
NMLZ-老 2/3PL:POSS-邊=LOC 和 比較 NMLZ-大
ɲə-wâ=j *kʰaja* *ka-pa* *ma-wdân*
2/3PL:POSS-（某人）那裡=LOC 頂嘴 NMLZ-做 NEG-允許
對年長的還有年紀比自己大的不可以頂嘴（字面：在年長的他們那邊，還有在年紀比自己大的那裡不可以頂嘴）。（我的祖母）

然而，與甲足話密切接觸的羌語，接受者論元一般都須直接加上與格依附詞 =*ʃi*，例如：

（9）a. *kaʃi* *qaᵏ=**ʃi*** *qʰaᵏlə=a* *da-gʒə*
扎西 1SG=DAT 饃饃=DEF PFV-給
扎西把饃饃給了我。
b. *qaᵏ* *namuᵏ=**ʃi*** *tʂʰaᵏ* *e-mi-dʒə-a* [emiʒɐ]
1SG 納姆=DAT 罵 IPFV:PST-NEG-做-1SG
我沒罵（字面：對……做出責罵）過納姆。

甲足話與格的用法不同於一般嘉戎語，甚至與格依附詞的語音形式都與羌語頗為相似，也可能是在羌語影響之下的創新發展。

2.3 藏語影響霍爾語

霍爾語群是漢藏語系羌語支嘉戎語組的獨立語群，包括北部（壤塘縣）、西部（新龍縣）、中部（道孚、丹巴、爐霍、金川縣）等互不通話的霍爾語，各自都有顯著的方言差異（Sun 2019）。道孚霍爾語（以下簡稱「道孚話」）是一種研究較多的中部霍爾語，分布在甘孜州道孚縣鮮水鎮、瓦日鎮，以及孔色、麻孜、葛卡、木茹、甲斯孔等鄉。[21]

[21] 道孚縣沙沖鄉的語言屬於中部霍爾語另一方言。

川西甘孜州屬於藏文化圈，強勢的本土語言藏語處於表層語言（superstrate）地位。道孚縣的玉科鎮、八美鎮、泰寧鎮、銀恩鄉、七美鄉、龍燈鄉、色卡鄉，乃至鄰近爐霍縣、壤塘縣多數地區都使用藏語，雙語制普遍。各地霍爾語長期深度接觸藏語，呈現活力趨弱，漸為藏語取代的傾向。道孚話在藏語長期影響之下，處處可見藏語的痕跡。以下就詞彙及語法方面分別介紹。

2.3.1 詞彙的影響

道孚話詞彙包括很高比例的藏語成份，[22] 宗教文化借詞之外，還包括表達自然現象、身體部分、本地動植物的名詞，以及若干動詞及語法虛詞，例如：

表 14. 霍爾語道孚話的藏語借詞

	道孚話	書面藏語
彩虹	ⁿdʒɐ	'ja
雪	kʰɐ-vɐ	kha-ba
身體	ʁzu-pu	gzugs
大腿	blʌ	bla
蹄	rɲu-pɐ	rmig-pa
獠牙	ⁿtʃʰə-vɐ	mche-ba
花	me-ta	me-tog
核桃	rtɐr-gɐ	star-ka
高	mtʰu	mtho
矮	ʁmɐ	dma'
講述	fʃʌ	bshad

22 值得注意的是，道孚藏借詞的語音形式不同於當地的安多藏語，例如「雪」*kʰɐ-vɐ* <kha-ba> 保留古雙音節結構，而道孚、爐霍的安多話都合併為單音節 *kʰɒ*，說明它們並非近代從安多藏語借入。因此，本小節採用書面藏語與道孚話比較。

續上表

	道孚話	書面藏語
埋藏	skoŋ	skung
痊癒	dʐa	drag
使用	spjo	spyod
不但	mə-tsʰʌ	mi-tshad
當然	le	los

2.3.2 語法的滲透

大量藏語成份也進入道孚語法，方式包括借用結構標記、仿造結構框架，甚至移入整個結構。

2.3.2.1 借用結構標記

除了藏式結構之外，道孚話也使用明顯源自藏語的語法標記，包括聯合複句的標記 *ʒʌʒʌ*（下例（10）；<zhor>「邊……邊……」），終點格的標記 *bʌ*（下例（11）；<bar>「迄、到」），以及 S/A 主語的名物化標記 *ŋkʰʌ*（下例（12）；<mkhan>「者」）：

（10） *tʃʰəgə* *tʰə=ji* *jəze=ɣu* *zjorɐ* ***ʒʌʒʌ*** *jə=tʃʰu*
然後 那=GEN 小鬼=AGT 哭 一邊 說=SEQ
然後，那小鬼一邊哭，一邊說。 （兩個獵人的故事）

（11） *χavʒi* *nə-zɟɐ=tʃʰu* *ɣə-ⁿdzu-sʰi*
還 PST-誦經=SEQ PST-持續-HS
*sɲəχcən=**bʌ*** *nə-zɟɐ-sʰi*
中午=TERM PST-誦經-HS
他還是繼續誦經，一直誦到中午。 （兩個超渡喇嘛）

（12） a. *ɐsɲi* *tʰəɲi* *rəvə=nə* *mpʰrimə.jə=**ŋkʰʌ**=ʁe* *ɮe-sʰi*
一天 3PL 村子=LOC 算命=NMLZ:S=INDF 來 2-HS
有一天，他們村子裡來了一位算命的。（木拉典備）

b. *ɐkʰəstʌⁿbɐ* *scʰoco=**ŋkʰʌ**=ɣu* *ɐkʰəstʌⁿbɐ=də* *vdu-sʰi*
阿古登巴 追=NMLZ:A=AGT 阿古登巴=ACC:DET 看見-HS
追阿古登巴的人看見了阿古登巴。（木拉典備）

2.3.2.2 複製結構框架

仿譯（calque）也是道孚語接納藏語影響的一種方式，即以道孚本土詞形複製藏式結構，例證包括贅語式非完整體以及接觸動詞的賓語形式。

2.3.2.2.1 贅語式非完整體

藏語的非完整體動詞形式，是將現在詞幹添加名物化後綴後結合存在動詞構成的贅語式（V-NMLZ + existential copula），如下例：

（13） 書面藏語
khotsho=s *khyod=kyis* *thoba* *de=s* *ci=zhig* *byed=**bzhin***
3PL=ERG 2SG=ERG 錘子 那=INS 什麼=INDF 做=NMLZ
yod *ces* *dris*
在 QUOT 問:PST
他們問說：「你用那個錘子在做什麼？」（兇殘的國王與雉雞）

而在形態保守的嘉戎語組語言中，非完整體一般採用直接在動詞詞幹添加前綴的形態手段。例如草登嘉戎語的及物進行體前綴 *ɐsɐ-*（14a），以及壤塘縣北部霍爾語（宗科話）的非完整體前綴 *də-*（14b）：

（14） a. 草登話

ɐɟiʔ *ʈʃeʔ* ***ɐsɐ-tʰi-aŋ***

1SG 茶 CONT:TR-喝-1SG

b. 宗科話

ŋá *dʒàˀ* ***də-tʰə̀-aŋ***

1SG 茶 CONT-喝 2-1SG

我在喝茶。

須注意的是，上句宗科話也可表達為類似藏語的贅語式（15）：

（15） 宗科話

ŋá *dʒàˀ* *tʰə́-ʒə* ***dʒì-aŋ***

1SG 茶 喝=NMLZ 在-1SG

我在喝茶。

道孚話承襲藏式結構更為徹底，非完整體只能體現為贅語式：

（16） *jo* *nə-ve=re=ji* *tʃʌɣɐ*

家 PST:DOWN-去=NMLZ:OBL=GEN 路邊

rŋʌnpɐ *ɣnə=ʁe=ɣu* *dʒɐ* *və=**gə*** *də-**ɟəɟi**-sʰi*

獵人 兩個=INDF=AGT 茶 做=NMLZ PST-在:PL-HS

在回家的路邊，有兩個獵人正在燒茶。 （米拉日巴的故事）

2.3.2.2.2 接觸動詞的賓語形式

「打」、「咬」、「推」、「拉」等接觸動詞（surface-contact verbs）屬於及物性不典型的雙價動詞，其受事者不必產生狀態改變，跨語言常見表達為處所（Tsunoda 1985: §2; DeLancey 2000: 7; Rappaport & Levin 2005: §1.5）。以（書面）藏語為例，這類動詞的受事者一般要加位格標記：[23]

[23] 書面藏語文本語料引自 Tshedbang Rdorje et al.（2007: 62）。

（17） *dom* *gtumpo=s* *amaribong=**la*** *rgyunpar* *gcar=zhing*
黑熊 兇暴=ERG 兔媽媽=LOC 經常 打=SEQ
kho *mo=r* *groma* *brko=ru* *bcug*
3SG 3SG:F=LOC 蕨麻 挖:FUT=COMP 使:PST
兇暴的黑熊經常毆打兔媽媽，使喚她去挖蕨麻。 （兔寶寶與兇暴熊）

嘉戎語組語法保守的語言一般無此現象。下例中，草登嘉戎語動詞「拉」的受事者「狼」不可帶任何格標記：

（18） 草登話
qʰoʔ *ó-me* *ne-stoki*
SEQ 3SG:POSS-腿 PFV:DOWN:TR-伸 2
qʰoʔ ***spjaŋku*** *te-**rɐʃe**-cə*
SEQ 狼 PFV:UP:TR-拉 2-MED
綿羊於是把一隻腿伸了下去，把狼拉了上來。 （狼與綿羊）

然而，道孚話已發展出類似藏語的結構，接觸動詞的賓語須加源自處所名詞的格標記 *=ʁa*，如例（19b–c）：

（19） a. *tʃʰəregə* *ʃʰɐⁿbɐ* *da* *gə-v-kʰrə-sʰi*
然後 人名 也 PST-TR-逮住-HS
（他們）抓住了（霍爾國大將）*ʃʰɐⁿbɐ*。 （霍嶺大戰）
b. *ɣdzəvə=ʁe=ji* *ʝɐ=**ʁa*** *gə-v-kʰrə=tʃʰu*
老頭=INDF=GEN 手=ACC PST-TR-抓=SEQ
（他）抓住了一個老人的手。 （野人請醫生的故事）
c. *ŋa* *ɲi=**ʁa*** *də-kʰrə-u*
1SG 2SG=ACC PST-抓-1SG:TR
我抓住你（身體）了。

從上例明確的及物形態（及物前綴 *v-* 及第一人稱單數及物後綴 *-u*）可知，這三句中的動詞 *kʰrə*「逮捕」、「抓住」都是及物用法。（19a）句的 *kʰrə* 指不凸顯身體接觸的「逮捕」，賓語 *ʃʰɐ̃ⁿbɐ* 無旗標，而（19b–c）句的 *kʰrə* 指強調「表面接觸」的「抓住」，賓語「手」、「你」須加上語法化自普通名詞 *ʁa*「垂直表面」的賓格標記 *=ʁa* 。此外，道孚話 *=ʁa* 也可作為典型的位格（20a），與藏語的用法一致（20b）：

（20） a. 道孚話

ɐʒʌkʰɐ *ʃʰʌn=**ʁa*** *ɣvəzɐ=lu* *gə-nə-sʰi*

一會兒 玻璃=LOC 蒼蠅=CLF PST-落-HS

過了一會兒，一隻蒼蠅落在了玻璃上。 （阿古登巴賣茶壺給腳夫的故事）

b. 書面藏語

gsermomtsho=yis *rgyalpo='i* *dbuskra* *bzhar=skabs*

金女孩=ERG 國王=GEN 頭髮【敬】 剃=時

migchu *rgyalpo='i* *ske=**la*** *lhung*

眼淚 國王=GEN 脖子=LOC 掉

當金女孩給國王剃髮時，一滴眼淚掉在國王的脖子上。

（金女孩銀女孩與木女孩）

2.3.2.3 移入整個結構

嘉戎語組語言有多種嚴格定義的「真性補語句」及表達類似語義功能的「補語策略」（Dixon 2006; Sun 2012; Jacques 2016; Tian & Sun forthcoming）。道孚話有豐富多樣的補語構造，其中「複雜謂語」補語策略，係將主要及附屬命題語義的詞根組成複合詞，另加輕動詞作為謂語：[24]

[24] 類例還有「想要」V + *ʂni bro*（來自藏語 <snying.bro>），句例如下：

（i） *ŋɐ=ji* *bjoŋnoŋ* *ŋgə-**ʂni*** ***bro**-rə*

1SG=GEN 肉 吃-心 出現-IMM

我想吃肉（字面：我的吃肉心出現了）。

（21） *tʰə=ji* *cə-**ŋgu*** *gə-**ndzu***
3SG=GEN 收割-頭 PST-插
他開始收割了（字面：他插下收割頭了）。

這種補語策略，非但詞形 ***-ŋgu***（<'go>「頭」）、***ndzu***（<'dzugs>「插、樹立」）為藏借詞，甚至結構也與藏語相同（如下例（22a）），明顯是全套借用。而相應的草登嘉戎句例（22b）則是真性補語結構，「開始」是帶有賓語補語句的及物帶補動詞：[25]

（22） a. 書面藏語
kho *song* *song* *mthar* *yang.bskyar*
3SG go:PST go:PST 逐漸 又
*ltogs-**'go*** ***brtsams***
餓-頭 開始:PST
他走著走著，逐漸又餓起來了。 （小公雞）

b. 草登嘉戎語
qʰoʔ ***kɐ-mtser*** ***kɐ́-ʃpa**=rɐʔ*
SEQ NMLZ-餓 NMLZ-渴=PL
*ne-**ɟe*** *ŋoʔ-cə*
PFV:TR-開始 2 繫詞-MED
於是它開始餓了，渴了。 （狼與綿羊）

3. 結論

本文提供三個案例，介紹四川境內漢藏語因語言接觸產生的語法演變，兼及詞彙證據。所涉及的四種語言中，藏語源自青藏高原，七世紀才向東擴散進入四川，而羌、嘉戎、霍爾均為源遠流長的本土語言。

[25] 審查人之一提醒：嘉戎語其實也採用借用藏語語詞的補語策略。確實如此，例如草登嘉戎語的 *tʰaʔ kɐ-tʃot*「決定」（< 藏語 <thag.gcod>）便須結合加名物化前綴 *kɐ-* 的名詞補語句；嘉戎語群的其他例證，請參 Jacques（2021: §22.4.3.3）。

三個案例呈現的互動屬性不同，從借入詞彙的語義分佈大致也可看出端倪。嘉戎語在色達、壤塘縣相對弱勢，色–杜藏語少量源自嘉戎語的詞彙多為本地動植物名稱，說明色–杜藏語帶有嘉戎語的底層。黑水縣沙石多鄉的四土嘉戎語與西北羌語均為藏文化圈內無文字，社會語言地位相埒的小語種，比鄰而處，互為附層。甲足話為數極少的羌語借詞，應屬雙語制下偶然滲入的區域詞。相較於此，道孚縣霍爾語的詞彙則充斥藏借成分，這也吻合藏語在當地的優勢表層地位。

上述三種屬性不同的深度接觸，導致了不同程度的語法演變，總結如下表：

表 15. 語言接觸三個案例的互動屬性及語法演變

	互動屬性	語法演變
嘉戎 → 藏	底層影響	以元音變音新造動詞過去詞幹
羌 → 嘉戎	附層影響	產生主語型動詞人稱模式 產生接受者論元的與格標記
藏 → 霍爾	表層影響	直接借用語法標記 複製語法框架 移入整個結構

本文來自四川的語料，也對觀察語言接觸現象提供了有益的省思。

其一：接觸影響不必簡化。接受接觸影響的語言體系是否發生簡化，取決於語言接觸的型態。封閉社群間長期密切互動的多語制語言接觸，容易發生「增加性移借」（additive borrowing）[26] 導致語言系統更為複雜，因為相鄰語言的多樣性正是孕育語言複雜度的溫床（Nichols 1992: 193）。[27] 本研究揭櫫的語言事實為此提供了佐證：現代藏語動詞形態發展的總趨勢是簡化。而深度接觸嘉戎語的色–杜藏語反其道而行，嘉戎語的底層影響帶來甚至超越古藏語的詞幹變化交替；沙石多嘉戎語接觸採「主語型」動詞人稱體系的羌語，也孕育出「主語型」、「分裂型」兼容並蓄，更複雜的人稱體系。

[26] 「增加性移借」指的是外來成分直接添加至本土體系。另外還有外來成分取代本土成分的「替代性移借」（replacive borrowing）以及外來影響造成本土成分消失的「刪減性移借」（substrative borrowing）（Gardani 2020）。

[27] “Diversity among neighboring languages fosters complexity in each of the languages”（Nichols 1992: 193）。反之，強勢語言快速擴散至鄰近地區，因而產生大量成年的第二語言學習者，才是導致語言系統簡化的關鍵（Trudgill 2020: §2）。

其二，接觸影響方向多元。藏語是四川強勢的本土語言，過去文獻較關注藏語對其他語言的影響。然而本文所揭櫫的底層與附層影響案例，說明本地存在更多元的語言互動情境，值得今後認真探究。

其三，接觸演變難設上限。在語言深度接觸，多語制盛行的情況下，任何語言成分都有可能移植。一般認為動詞是最難借用的詞類（Haspelmath 2008: 8），形態是最難借用的語法部門（Mithun 2015: 37），而曲折形態則是最難借用的語法成分（Matras 2007: 61）。然而事實證明，即使是跨語言極為罕見的動詞詞幹曲折形態，仍可由底層語言引進。

其四，語言接觸促使結構更新。語法借用大致可分為形式借用（matter borrowing）與模式借用（pattern borrowing）（Matras & Sakel 2007; Gardani 2020）。後者通常在長期深度的接觸情況下發生，除了借入新的結構外，也會造成現有結構的重組（Aikhenvald 2002: §1.2）。本文介紹的接觸個案，都牽涉新興的結構模式，包括色–杜藏語動詞的詞幹變音形態（stem-building by ablaut），沙石多嘉戎語的與格標記、動詞擴大重組的主語型人稱模式，道孚霍爾語的賓格標記、非完整體形式、及複製於藏語的補語策略。更值得注意的是，論元核心格旗標的引進，也導致沙石多嘉戎語與格西霍爾語的語法進一步發生由中心語加標（head-marking）格局朝向附屬語加標（dependent-marking）格局的轉變。

由此可見，闡釋四川地區語言語法的歷時演變，多元化的語言接觸現象是必須考慮的重要因素。

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縮寫表

1	first person（第一人稱）
2	second person（第二人稱）
3	third person（第三人稱）
A	agent-like argument of canonical transitive verb（典型及物動詞的主事者論元）
ACC	accusative（賓格）
AGT	agentive（主事格）
CLF	classifier（量詞）
COMP	complementizer（補語標記）
CONT	continuous aspect（持續體）
DAT	dative（與格）
DEF	definite（定指）
DET	determiner（限定詞）
DM	discourse marker（話語標記）
DU	dual（雙數）
EGO	egophoric（自知示證）
ERG	ergative（作格）
F	feminine（陰性）
FUT	future tense（未來時）
GEN	genitive（屬格）
HS	hindsight evidential（後知示證）
IMM	immediate evidential（新知示證）
IMP	imperative（命令式）
INDF	indefinite（非定指）
INS	instrumental（工具格）
INTR	intransitive（不及物）
INV	inverse（反觀點）
IPFV	imperfective（非完整體）
LOC	locative（位格）
MED	mediative evidential（中介示證）

NEG	negative（否定）
NMLZ	nominalization（名物化）
OBL	oblique（斜格）
PFV	perfective aspect（完整體）
PL	plural（複數）
POSS	possessive（領屬格）
PRS	present tense（現在時）
PST	past tense（過去時）
Q	question marker（疑問標記）
QUOT	quotative（引述標記）
SBJ	subject（主語）
SEQ	sequentializer（連句成分）
SG	singular（單數）
TERM	terminative case（終止格）
TR	transitive（及物）

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Impact of intense language contact on morphosyntax: Three case studies from Sichuan

Sichuan has always been an area of remarkable ethnic and linguistic diversity. A rich variety of Sino-Tibetan languages are spoken within its borders, exhibiting considerable typological differences. Widespread multilingualism and long-standing mutual interactions have exerted profound effects on the grammatical systems of these languages. Drawing on primary data, this article explores three cases of contact-induced morphosyntactic changes observed in the local Sino-Tibetan languages. The interacting pairs are distinct (Tibetan ↔ Rgyalrong, Rgyalrong ↔ Qiang, Horpa ↔ Tibetan), yet the target languages under scrutiny all undergo convergent structural changes wrought by intensive contact. New types of inflectional morphology and syntactic patterns are introduced, leading even to altered grammatical profiles. This study demonstrates that, to properly understand grammatical evolution of languages of this area, it is essential to fully appreciate the complex and diverse phenomena of language contact.

Keywords: Sino-Tibetan languages of Sichuan, language contact, grammatical change, superstratum, adstratum, substratum

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本文探討臺灣閩南語中三個常用口語詞的本字，分別是：1. 表兼有、含有、帶在身邊的動詞 kã2；2. 表示充滿、漲潮的形容詞 tĩ6 以及 3. 表示引誘、招來義的動詞 siã2。這三個詞彙在臺灣閩南語中今讀韻母均為鼻化韻，不容易辨認早期韻尾的樣態，從而也就難以決定正確的漢語語源。本文利用近來出版的閩東語材料及原始閩東語的擬測，找出相應的同源詞，從而確認上面這三個口語詞早期都帶有 *-m 韻尾。從漢語音韻史的角度來看，這三個語詞的語源來自中古咸攝。這三個詞彙的漢語本字及原始閩語的形式分別是：kã2 是「銜」*kɑim2，tĩ6 是「潭」*tiam4，siã2 是「豔」*siɑm2。

關鍵詞：臺灣閩南語、閩東語、原始閩語、本字、比較方法

1. 前言

1.1 本字研究的方法

漢語方言本字研究，其本質是歷史語言學的研究。具體來說，是在現代漢語方言與漢語歷史文獻之間尋找「同源詞」(cognate)。本字研究的基本要求是「音準義合」，透過準確的音韻對應以及合理的語義變遷，探求現代漢語口耳相傳的語詞在歷史文獻上曾經存在過的寫法。漢語方言本字的研究方法包括：[1]

覓字：增加吾人對典籍難字的認識；
尋音：增加吾人對音韻對應的認識；
探義：增加吾人對語義變遷的認識。

[1] 覓字法和尋音法係由梅祖麟（1995）提出，探義法則由楊秀芳（1999）提出，以上本字研究具體的方法論操作可以參看楊秀芳（2000）。

以上覓字、尋音、探義三種方法，分別以字形、字音、字義為未知項，運用時或者各有偏重，然而整體來說，均須從形、音、義三個向度進行交叉比對，以求全面且系統地建立漢語方言口語詞與漢語歷史文獻之間的關係。本文關於本字的考證，主要便仰賴這三個方法。[2]

方言本字考證就是方言語源考證，也就是為某個現代漢語方言的口語詞找到一個漢語書面文獻上的同源詞，其本質屬於歷史語言學研究。因此，歷史語言學的比較方法（comparative method）也是本文主要採取的方法。現代漢語方言中的本字認定往往存在不同看法，倘若能在漢語書面文獻中為某個寫法找到相同或平行之用例，這類爭議便可以得到解決。此外，漢語方言間的橫向比較以及讀音比對，也可望確認某些語義上發生變化的本字。

本文預計討論三個臺灣閩南語的口語詞，它們分別是：

1. 臺灣閩南語表兼有、含有、帶在身邊的動詞 kã2 的本字：銜；
2. 臺灣閩南語表示充滿、填滿義的形容詞 tĩ6 的本字：澹；
3. 臺灣閩南語表示引誘、招來義的動詞 siã2 的本字：豔。

這三個口語詞都是中古咸攝字，分別來自咸攝二等、四等和三等。換言之，這三個本字在早期階段都收 *-m 尾，此為本文題目取義所在。本文在研究方法上主要透過原始語（Proto Min & Proto Eastern Min）及漢語典籍證據這兩方面，綜合地論證閩南語（包括原始閩南語）中鼻化韻的本字。本文所論三個本字在原始閩南語中也都讀為鼻化韻，這也就是說，光看閩南語實際上不能推測早期韻尾究竟是 *-m、*-n、*-ŋ，抑或是後起的鼻化。準此，本文以早期帶 *-m 韻尾為題，亦具有揭示方法論之意涵。

本文所引用之所有現代漢語及其方言之讀音，全部使用國際音標（IPA）。聲調則以數字標註調類，具體如下：陰平-1、陽平-2、陰上-3、陽上-4、陰去-5、陽去-6、陰入-7、陽入-8、輕聲-0。[3]

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[2] 關於更詳盡的方法論說明也可參看我們（吳瑞文 2021）較為詳細的說明。

[3] 審查人指出，原始閩語的聲調系統是 A、B、C、D 四調，同時還存在帶音聲母（如 *g-、*d-、*z-）等。我們的看法頗有不同。原始閩語存在幾個調類，實質上仍有討論空間。所謂原始閩語 A、B、C、D 四調格局，在我們看來應當視為「前原始閩語」（pre-Proto Min）的情形，與原始閩語不能直接等同起來。為求審慎，本文暫時認為原始閩語是個八調（1、2、3、4、5、6、7、8）系統的語言，並且原始閩語階段帶音聲母也已經清化。此外，本文以考證臺灣閩南語本字為基本切入點，須隨時與漢語音韻史進行參照，因此採用漢語音韻論文常見的平、上、去、入對應數字調類的方式，不另立 A、B、C、D 調類以免混淆。

本文標寫方言例句時，主要根據萊比錫標注系統（The Lepzig Glossing Rules）而有所簡化。整體而言，凡獨立成段的方言例句都以三行來呈現，第一行為國際音標拼寫，第二行為逐詞標註，第三行為全句之中文翻譯。不獨立成段的例句，則僅在音標後標注漢字。漢語方言往往存在本字認定問題，閩南語音字關係不明的現象更多，本文進行閩南語逐詞標註時，盡量標寫本字而不用訓讀字或方言字。另外，本文語料出處包括 Douglas（杜嘉德 1990[1873]）的《廈英大辭典》、姚榮松總編輯之《臺灣閩南語常用詞辭典》以及本人自己採集的語料。語料來源各有不同，本文不將《辭典》標音統一，主要考量是保留原始語料之面貌。

1.2 咸攝在原始閩語中的音韻層次

中古《切韻》及其所提供的音韻框架，是探討漢語音韻史及相關議題的重要根據。除了《切韻》系韻書外，中古之後興起的不同時期的韻圖（《韻鏡》、《七音畧》、《四聲等子》）也提供了重要的音類訊息。因此本文底下便以《切韻》韻目配合宋代韻圖所列十六攝的架構，對本字進行探討。

上面已經提到，本文中所要討論的三個本字都屬於中古咸攝。關於咸攝在閩語中的音韻層次，我們（吳瑞文 2018）曾提出相對全面的論述，咸攝在原始閩語中的音韻層次可歸結如下：

表 1. 從中古音看原始閩語咸攝韻母的音韻層次

	原始閩南	原始閩東	原始閩北	原始閩語	同源詞例
覃 Ⅰ	*-am/*-aʔ	*-am/*-ap	*-oiŋ/*-oi	*-əim/*-əip	潭含/合
Ⅱ	*-am/*-ap	*-am/*-ap	*-aŋ/*-a	*-əm/*-əp	貪涵/納雜合
談 Ⅰ	*-ã/*-aʔ	*-am/*-ap	*-aN/*-a	*-ɑm/*-ɑp	三籃/蹋
Ⅱ	*-ã/*-aʔ	*-am/*-ap	*-aŋ/*-a	*-am/*-ap	藍膽/塔
咸 Ⅰ	*-ã/*-aʔ	*-am/*-ap	*-aN/*-a	*-ɑm/*-ɑp	餡/煠
Ⅱ	*-iam/*-iap	*-ɛm/*-ɛp	*-eiŋ/*-o	*-iəm/*-iəp	鹹減/夾眨
銜 Ⅰ	*-ã/*-aʔ	*-am/*-ap	*-aiN/*-ai	*-ɑim/*-ɑip	銜/壓
Ⅱ	*-ã/*-aʔ	*-am/*-ap	*-aŋ/*-o	*-am/*-ap	監/鴨
鹽 Ⅰ	*-ĩ/*-iʔ	*-iɛm/*-iɛp	*-iɛŋ/*-iɛ	*-iam/*-iap	櫼染鹽/摺
Ⅱ	*-iã/*-aiʔ	*-iam/*-iap	*-iaŋ/*-ia	*-iɑm/*-iɑp	饜焰染/葉
添 Ⅰ	*-ãi/*-aiʔ	*-aim/*-aip	*-aiŋ/*-ai	*-aim/*-aip	點店念/貼
Ⅱ	*-ĩ/*-iʔ	*-iɛm/*-iɛp	*-iɛŋ/*-iɛ	*-iam/*-iap	拈甜添/碟

歸納上表，咸攝內部諸韻在原始閩語中有以下 9 套音韻形式：

-əm/-əp	*-əim/*-əip	*-iəm/*-iəp
-ɑm/-ɑp	*-ɑim/*-ɑip	*-iɑm/*-iɑp
-am/-ap	*-aim/*-aip	*-iam/*-iap

以上這個架構，是在（Norman 1981）原始閩語韻母擬測的基礎上增加比較的方言數量並擴充同源詞的內容而得出。以上原始閩語及原始閩語次方言的擬測，乃是本文探討閩南語咸攝本字的重要基礎。

2. 閩南語兼有義動詞 kã2 的本字

臺灣閩南語中有一個相當常用的動詞 kã2，其義項包括 1. 兼有、連帶、包括以及 2. 帶著、帶在身邊。臺灣閩南語具體之用例如下：[4]

（1）*tsit7 bi6 u6 kã2 ti6 lai6 te3*
這 味 有 銜 著 裏 底
這個成分包含在裡面。

（2）*tham2 kã2 hueʔ7*
痰 銜 血
痰帶血。

（3）*i1 tsit8 e2 tsa1 bɔ3 laŋ2 kã2 sã1 e2 gin3 a3, tho3 than5 bo2 kan3 tan1*
伊 一 個 諸 母 儂 銜 三 個 囡 囝 討 趁 無 簡 單
他一個女人家帶三個小孩，賺錢不容易。

（4）*kã2 tsit8 e2 gin3 a3 tshut7 khi5 tshit7 tho2, ke1 tsin1 tshu5 bi6*
銜 一 個 囡 囝 出 去 迌 迌 加 真 趣 味
帶一個小孩去玩，有趣得多。

[4] 例句全部根據《臺灣閩南語常用詞辭典》https://twblg.dict.edu.tw/holodict_new/。

以上例句（1）、（2）相當於連帶，兼有；（3）則是兼有連帶和帶領兩種義涵；（4）在用法上則相當於帶領義動詞 tshua6「炁」。《辭典》將上述義項 kã2 的方塊字寫作「含」，中古反切為胡男切，音韻地位為咸攝一等覃韻匣母平聲。這個寫法我們認為並非正確的本字，有進一步深究的必要。

首先就音韻地位來看，中古咸攝一等覃韻在閩南語中基本上沒有讀為鼻化音 -ã 韻母者，其音韻對應都是 -am，並且這一對應可以追溯到原始閩南語的階段。關於原始閩語及原始閩南語咸攝的音韻層次問題，我們（吳瑞文 2018）已經有相當全面的分析。下面直接引用我們關於閩南語覃韻的同源詞表，唯一不同的是把永春換成臺灣閩南語，並刪去若干同源詞。請看下表：

表 2. 六種閩南語次方言的覃韻同源詞表

	臺灣	泉州	漳州	東山	汕頭	揭陽
貪	tham1	tham1	tham1	tham1	tham1	tham1
譚	tham2	tham2	tham2	tham2	tham2	tham2
南	lam2	lam2	lam2	lam2	lam2	lam2
男	lam2	lam2	lam2	lam2	lam2	lam2
簪	tsam1	tsam1	tsam1	tsam1	tsam1	tsam1
參	tsham1	tsham1	tsham1	tsham1	tsham1	tsham1
慘	tsham3	tsham3	tsham3	tsham3	tsham3	tsham3
龕	kham1	kham1	kham1	kham1	kham1	kham1
感	kam3	kam3	kam3	kam3	kam3	kam3
含	kam2	kam2	kam2	kam2	kam2	kam2
暗	am5	am5	am5	am5	am5	am5

整體來看，覃韻在各閩南語次方言中的對應都是 -am，沒有任何一個讀為鼻化韻母 -ã。

另一個具有啟示意義的現象是「含」和「涵」的文白異讀。根據我們（吳瑞文 2018: 95）的分析，「含」、「涵」兩字中古同為胡男切，也就是同音字。它們在臺灣閩南語中的文白異讀如下：

含：白話音 kam2，意思是含在口中；

文讀音 ham2，用於「含笑」ham2 tshiau5、「含冤」ham2 uan1。

涵：白話音 am2，埋地下疏通汙水的管道稱為「涵溝」am2 kau1；

文讀音 ham2，用於「包涵」pau1 ham2、「涵蓋」ham2 kai5。

根據以上「含」、「涵」兩字的文白異讀，我們可以肯定匣母在閩南語中有三個不同的音韻層次：讀為舌根塞音 k-、讀為零聲母 ø、讀為喉擦音 h-；以性質而言，喉擦音 h 均屬文讀層，舌根塞音 k- 和零聲母 ø 則屬於白話層。儘管聲母有三個音韻層次，然而韻母則都是 -am，這是韻母上不同層次合流的表現，也就是「異層同形」。根據以上的分析，從同源詞的對當來看，要說覃韻陽聲韻字在閩南語有鼻化韻母 -ã 這一項語音規則對應，委實難以成立。

關於臺灣閩南語動詞 kã2 的本字，我們（吳瑞文 2018: 112）已經指出是「銜」，戶監切，咸攝二等銜韻匣母平聲字。惟文中只就音韻對應上立說，未就漢語歷史文獻進行探討，底下我們根據文獻略作補充。

許慎《說文解字》釋「銜」字曰：「馬勒口中，从金从行。銜，行馬者也」。段注解釋「銜」的意思是「其在口中者謂之銜，銜者，所以行馬者也……。凡馬提控其銜以制其行止」。由此可知，「銜」原指馬口中噙咬的鐵製工具，用來操控馬匹行進的方向。事實上，「銜」在古籍中除了用為名詞的馬口銜之外，很早就從名詞派生出動詞用法，「銜」用作動詞的意義包括「口銜」、「懷有」以及「帶領」等，例如：[5]

（5）遂鼓行，徒銜枚而進。（《周禮・夏官・大司馬》）

（6）無父何怙？無母何恃？出則銜恤，入則靡至。（《詩經・小雅・蓼莪》）

（7）仕弗與共國；銜君命而使，雖遇之不鬥。（《禮記・檀弓》）

（8）景帝嘗屬諸姬子，曰：「吾百歲後，善視之。」栗姬怒不肯應，言不遜，景帝心銜之而未發也。（《漢書・外戚傳》）

以上（5）是指把具體的「枚」（古代行軍時，讓士兵銜在口中以禁止言語的箸）銜在口中。這是「口銜」的基本用法。（6）「銜恤」指心中懷帶憂傷；（7）「銜君命」是指承接君命，由於君命是被指派的，所以這是被動地帶有；（8）是指內心懷帶不滿，這個用法相當於對某人懷忿在心（6）、（8）的內心懷帶以及（7）的承帶這些用法較為抽象，「人以口銜某物」也就是「人身上帶有某物」，進而由原先具體的物品（「枚」）擴大到較為

[5] 本文引述之漢語歷史文獻都根據中國哲學書電子化計劃，網址 https://ctext.org/zh。

抽象的「憂慮」(「恤」）或「事件」(「栗姬怒不肯應，言不遜」)。至於「銜命」是指承受國君之命令而來，用以說明所受之「命令」來自國君，具有法理及權威，這也是較為抽象的用法。歸納而言，漢語文獻「銜」字由「口銜義」發展為及物的懷帶義動詞，賓語的語義內涵由具體而抽象。臺灣閩南語的兼有義與連帶義大致相當。

（9）飛來雙白鵠，乃從西北來。十十五五，羅列成行。妻卒被病，行不能相隨。五里一反顧，六里一裴回。吾欲銜汝去，口噤不能開；吾欲負汝去，毛羽何摧頹。(《宋書・卷二十一・白鵠・艷歌何嘗》）

例句（9）相當有意思，內容是指雌鵠猝然生病，無法繼續飛行，雄鵠回首張望，徘徊不忍遠離，然後自思「吾欲銜汝去，口噤不能開」。句中的「銜」若從鵠鳥本身的觀點來看固然是指「以喙叼銜」，但從人類的觀點來看，則是公鵠帶領母鵠一同飛行，因而隱含有「帶領」的意思。另一個值得留意的是語句結構，「銜汝去」本身是一個 [V1-O-V2] 的連謂句，跟上述臺灣閩南語例句（4）「kã2 tsit8 e2 gin3 a3 tshut7 khi5」（帶一個小孩出去）結構基本相同。這裡可以發現：文獻中的「銜」在表口銜意時，賓語都是具體名詞；表懷有、帶領義時，賓語都是抽象名詞。相對地，閩南語 kã2 表懷有、帶領義時，賓語都是具體名詞，似乎沒有看到「口銜義」的例證。也就是說，若以「銜」為 kã2 的本字，則漢語文獻與閩南語之間在用法上存在若干分歧。對此我們的解釋是：第一、閩南語欠缺「銜」的「口銜義」用法，不能排除是詞彙取代的結果。比較華語「銜」除了在「結草銜環」、「銜枚」這類書面用語之外，口語中「用嘴銜物」的詞彙是「叼」；閩南語「用嘴銜物」的詞彙則是「齩」ka6，例如「ka6 tsit8 ki1 hun1 tshe1」(「齩一支薰吹」，叼一根菸管)。第二、從文獻中「銜」的賓語由具體名詞擴大到抽象名詞的過程來看，閩南語 kã2 後接賓語多屬具體名詞而不接抽象名詞，這個現象本身說明閩南語保存「銜」相對初始的用法。

關於臺灣閩南語 kã2 的本字，林金鈔（1980: 150）認為是深攝三等侵韻群母平聲巨金切的「擒（捡)」，底下從音韻和語義兩方面加以檢討。

從中古音的角度來看，深攝「侵寢沁緝」諸韻在閩南語的基本對應是：

層次 I 白話音韻母：-am（枕飲）/ -ap（汁十）
層次 II 白話音韻母：-iam（針臨）/ -iap（粒習）
層次 III 文讀音韻母：-im（飲臨）/ -ip（十習）

由此可見深攝侵韻在閩南語都不讀為鼻化音韻母。唯一一個讀為鼻化音韻母的深攝字是「林」，白話音讀 lã2，用於地名；文讀音則是 lim2，用於姓氏。[6] 楊秀芳（2022）曾經深入討論「林」白話音的來歷，它是上古侵部三等字變入談部的例外，因而有鼻化音的表現。其他上古侵部讀入談部，並在中古階段歸入咸攝的還有「三」sã1、「銜」kã2、「衫」sã1 等。這裡應該注意等第：「三」是一等、「銜衫」都是二等，閩南語白話層有二等讀同一等及三等讀同一等的情況，「林」lã2 韻母讀同「三銜衫」就是等第混讀的情況。由此可知，「林」lã2 的讀音相當於咸攝一等談二等銜，這是個別語詞的例外，不屬於正規演變。因此《切韻》音系仍把「林」歸於侵韻，與談、銜諸韻截然有別。總而言之，「林」的變化是上古侵部三等字混入上古談部一二等字，時代不晚於東漢；尤其不能理解為中古的深攝三等字混入咸攝一二等字。除去「林」這個例外之後，是否可以主張「擒（捡）」也有相同的變化？從而認為中古侵韻也有 ã 這類對應？就音韻而言似乎並無不可，接著我們來考察一下語義。

擒，字又作捡或撟，巨金切，《廣韻》釋義為「急持」。《說文解字》：

捡，急持衣裣也。從手金聲。撟，捡或從禁。
段玉裁注：此篆古叚借作禽，俗作擒、作捡。走獸總名曰禽者，以其為人所捡也。又按此解，五字當作「急持也一曰持衣裣也」九字乃合。必轉寫有訛奪矣。

由此可知，「擒、捡、撟」的本義是「持取衣襟（裣）」或「快速地持取某物」，進而引申出捉拿、捕捉義。捕捉義的「捡」在早期文獻中多作「禽」字，從手的「擒、捡、撟」均為後起字。例如：

（10） 公曰：君子不重傷，不禽二毛。（《左傳・僖公二十二年》）

（11） 襄子困辱，乃禽智伯。（《史記・太史公自序》）

（12） 文王見詈於王門，顏色不變，而武王擒紂於牧野。（《韓非子・喻老》）

6 閩南語 lã2 實際讀音為 [nã2]，聲母音值為 [n]，這是受到鼻化韻母 ã 同化作用的影響。相對地，文讀音 lim2 實際讀音仍是 [lim2]，聲母音值為 [l]，這是由於韻母屬於非鼻化韻母，對聲母不產生任何影響。整體而言，泉漳系閩南語大致不分 /n/ 和 /l/ 這兩個音位，我們一律標為 /l/。

（13） 大夫種輔翼越王勾踐，而為之報怨雪恥，擒夫差之身。（《淮南子・氾論訓》）

以上「禽、擒」兩者為古今字的關係，都是捉拿、捕捉的意思。就語義本身而言，「擒、捡、撟」的捕捉義相當穩定，看不出演變為懷帶義及帶領義的跡象。綜合以上所說，音韻上以「擒（捡）」為 kã2，代價是讓侵韻在音讀上又產生例外；語義上文獻中未見「擒（捡）」演變為懷帶、帶領義的確證。基於「音準義合」的考量，我們並不接受深攝侵韻「捡」為臺灣閩南語 kã2 本字的這個看法。

歸納起來，臺灣閩南語的 kã2 就音韻表現及動詞語義內涵兩方面而言，可以聯繫到漢語書面文獻中「銜」。在句法結構方面，閩南語 kã2 承繼了「銜」的 [V1-O-V2] 的用法。同時應當要留意，臺灣閩南語的 kã2 既有「懷帶」（連帶、兼有）義也有「帶領」義，兩者都屬於動詞，目前還沒看到語法化的跡象。有許有人主張，kã2 是「含」kam2 在語音上個別發生弱化的形式，但衡諸閩南語 kã2 的語義沒有虛化跡象這一前提下，我們不採取這個觀點。歸結以上語義及語法兩方面的分析，配合音韻上的規則對應，我們認為閩南語的 kã2 的本字應該是咸攝二等銜韻匣母的「銜」而不是咸攝一等覃韻的「含」。

3. 閩南語充滿、填滿、潮水漲滿義動詞 tĩ6 的本字

現代閩南語中表示潮水滿漲的動詞及表示液體充滿、填滿的形容詞，使用的都是 tĩ6。關於閩南語 tĩ6 的釋義及各項用例，Douglas（1990[1873]: 493）有相當全面的記錄：[7]

tĩⁿ, full; well-filled; crowded; flood-tide.〔充滿；充實；塞滿；漲潮。〕
tĩⁿ moáⁿ-moáⁿ, very full, as with liquid.〔非常飽滿，如同液體一樣。〕
tĩⁿ lâu-lâu, full and overflowing, as liquid.〔飽滿而流溢出來，如同液體。〕
tĩⁿ that-that, very full; choke-full, as with goods, furniture, dirt, etc.〔非常飽滿；塞得滿滿的，如貨物、家具、污垢等。〕
that-that-tĩⁿ, very full; choke-full, as with goods, furniture, dirt, etc.; crowded in great quantities.〔非常飽滿；塞得滿滿的，如貨物、家具、污垢等；量多充塞。〕
tĩⁿ phóng-phóng (T.), crowded, as with people; choke-full, as with dirt; very fat, as face.〔擁

[7] 以下標音皆依 Douglas（1990[1873]）原樣：ch 相當於 /ts/，o 相當於 /u/（指 oa、oe 這類韻母，應當留意 ong 中的 o 則相當於 /ɔ/，兩者音值有別），鼻化音以 n 標註於音節末並上標；調號也標註於主要元音之上，tĩⁿ 轉寫為國際音標即為 tĩ6。〔 〕中的中文翻譯係本文所增。教育部《臺灣閩南語常用詞辭典》也收錄這個詞：1. Tê ài thîn hōo tīnn（茶愛斟予滇），屬於形容詞；2. lâu-tsuí-tīnn（流水滇），屬於動詞。Douglas 的記述相當詳盡，《常用詞辭典》內容附記於此。

擠，如同人群一樣；塞得滿滿地，如同泥土一樣；很肥胖，如臉型。〕
îⁿ-tīⁿ, very fat and plump, as fat man; very round and full, as large fine well-grown grain of rice.〔很胖很豐滿，像個胖子；非常圓潤飽滿，就像生長良好的大米粒。〕
toé-tīⁿ, to fill quite full.〔填滿〕
ûi kàu-tīⁿ, to crowd round in great numbers, as spectators.〔數量多而擁擠，形容許多人圍觀〕
pá-tīⁿ, stuffed full; fat, plump, and healthy, as well formed limb.〔塞滿；肥胖，豐滿而健康，形容肢體勻稱。〕
ke-hé pá-tīⁿ, wealthy.〔富有〕
thàn--khi pá-tīⁿ, to make a great deal of money; to become wealthy.〔賺大錢；變得富裕〕
tsiah̍ kàu pá-tīⁿ, to gorge one's self quite full.〔讓自己吃得相當飽足〕
tsúi-tīⁿ, flood-tide; beginning of flood-tide; quite full of water; water quite full, as in any place or thing.〔漲潮；潮水起始；漲滿的水；水很滿，就像在任何地方或事物中一樣。〕
tsúi tiām-tīⁿ, tide quite full; slack-water at high tide; the very top of the tide.〔潮水滿滿；漲潮時的潮水；漲潮的最高點。〕

由此可見，tĩ6 確實有動詞（如 tsui3 tĩ6 a0，水滿了）和形容詞（tsui3 tsiok7 tĩ6 e0，水很滿）這兩個用法。閩南語的 tĩ6 還可與其他語詞構成複合詞，例如表示豐滿的 ĩ2 tĩ6，表示飽滿的 pa3 tĩ6 等；也可以構成重疊形式，例如 tĩ6 buã3 buã3、tĩ6 lau2 lau2、tĩ6 that7 that7（或 that7 that7 tĩ6）等。

關於閩南語 tĩ6 的本字問題，不同學者間存在若干不同的看法，甚至同一位學者也有前後不同的意見。楊秀芳（1982: 91, 248, 479）首先指出 tĩ6 本字是「灗」(《廣韻》：水滿)。稍後，楊秀芳（1991: 71）則懷疑閩南語中表示滿盛的 tĩ6，其本字為「闐」。根據許慎《說文解字》：

闐，盛貌也，從門真聲。
段玉裁注「盛貌也」謂：謂盛滿於門中之貌也。
段玉裁注「從門真聲」謂：待年切。

類似的語詞釋義也可見於《廣韻》。《廣韻》收錄「闐」字，音徒年切（與段注待年切聲韻調均同）；釋義為「轟轟闐闐，盛貌」。以徒年切（山攝開口四等平聲定母）的「闐」為閩南語 tĩ6 的本字，聲母和韻母雖然符合閩南語內部的規則對應，然而聲調上卻難以解釋何以定母平聲字讀入陽去而不歸於陽平。

隨後周長楫（1998: 295）、林寶卿（1999: 287）、李如龍（2001: 40）及董忠司（2001: 1336）均將 tĩ6 寫成「滇」。周長楫並且引用《集韻》的資料，認為閩南語 tĩ6 的本字為「滇」，反切為堂練切（定母去聲），釋義為「大水貌」。「滇」在《廣韻》收都年切（端母平聲）、他甸切（透母去聲）和徒年切（定母平聲）三個切語，釋義如下：

滇　都年切，滇池，在建寧。
滇　他甸切，滇溟，大水，又音田。
滇　徒年切，滇汚，大水皃，又都年切。[8]

由此可知，在較早的切韻系韻書《廣韻》中，「滇」字只有端母平聲、透母去聲和定母平聲的讀法，並沒有其他切語。

歸納起來，關於閩南語 tĩ6，前此的學者或以徒年切的「闐」為本字，或以堂練切的「滇」為本字，或以水滿的「潭」為本字。在語義上，不論是盛貌或大水貌，都與閩南語表示充滿、充塞的謂詞 tĩ6 相當接近，是意義上可以被接受的候選本字。若進一步從語音上的規則對應來看，考慮到聲調表現為陽去而不是陽平，則堂練切的「滇」比起徒年切的「闐」更為切合。然而應當留意到，「滇」字之有堂練切（定母去聲）這一音讀，乃是始於《集韻》。由此可見，「滇」字定母去聲一讀乃是晚出的讀音，其實不無可疑之處。[9]

進一步從閩南語內部比較的觀點來看，以堂練切的「滇」為 tĩ6 的本字，其實仍存在一個疑問，那就是今讀聲調的表現。閩南語有泉州、漳州、潮州這三系的方言，泉州系和漳州系大致都屬於七調的方言，潮州系則是八調的方言。屬於七調方言的泉州系還可以大別為兩個次類：一類是永春或同安，聲調表現為：陰平、陽平、陰上、陰去、陽去、陰入、陽入共七類；另一類是泉州或晉江，聲調表現為：陰平、陽平、陰上、陽上、去聲、陰入、陽入，也是七類。值得留意的是，泉州晉江這類泉州系方言中的去聲，其轄字範圍包括中古的清去與濁去，也就是說，泉州晉江方言可以區別陽上和陽去。相對地，永春同安這類泉州系方言並無獨立的陽上，中古全濁上聲已經讀為陽去，因此無法區分中古全濁上聲字和全濁去聲字。[10]

8　本條釋義之「汚」字顯然有誤，當作「溟」。溟，莫甸切，滇溟，水大皃。今讀音同「麵」。

9　應當留意到的是，較晚收錄於文獻上的切語，並不必然就是後起的讀音。不過從「滇」的音讀線索來推敲，表大水貌的「滇」有徒年切、他甸切兩讀；同時在這一義項上「滇」又與莫甸切的「溟」字構成疊韻雙音節詞「滇溟」。歸納起來，「滇」字定母去聲一讀可能確屬後起音讀。例如「滇溟」這個疊韻雙音節詞由於音節縮略，因而有了「徒甸切」（即堂練切）的「滇」字一讀：聲母來自定母平聲的「滇」，韻母來自明母去聲的「溟」。

10　閩南語內部次方言的聲調比較參看董同龢（1959: 1041–1042）、張靜芬（2013: 52–53）、Kwok（2018: 188）。他們有大致一樣的看法，即：原始閩南語共有八調，這可能也就是原始閩語的聲調格局。

現在我們透過漳州系的漳州、泉州系的永春、泉州和潮州系的揭陽等四個方言[11]，觀察全濁上聲字「杜、是、舅、動」和全濁去聲字「度、示、舊、洞」這兩組同源詞的語音對比，並列出表示「填滿、充滿」的 tĩ6 在閩南語各次方言中的讀音：

表 3. 四種閩南語次方言的陽上與陽去

	杜	度	是	示	舅	舊	動	洞	*滿
漳州	tɔ6	tɔ6	si6	si6	ku6	ku6	taŋ6	taŋ6	tĩ6
永春	tɔ6	tɔ6	si6	si6	ku6	ku6	taŋ6	taŋ6	tĩ6
泉州	tɔ4	tɔ5	si4	si5	ku4	ku5	taŋ4	taŋ5	tĩ4
揭陽	tou4	tou6	si4	si6	ku4	ku6	taŋ4	taŋ6	tĩ4

根據上表可知，由於永春和漳州在聲調上都發生了濁上歸去的變化，因此「杜度、是示、舅舊、動洞」等字兩兩同音。泉州則不然，泉州方言中古濁上字今讀陽上，中古濁去字則讀去聲，因此「杜度、是示、舅舊、動洞」四組八字的聲調分屬 4、5 兩調。揭陽方言陽上和陽去有別，因此「杜度、是示、舅舊、動洞」四組八字的聲調分屬 4、6 兩調。表示「填滿、充滿」的 tĩ6，在永春讀陽去 tĩ6，在泉州則讀陽上 tĩ4，在潮州也讀陽上 tĩ4。[12]

透過以上閩南語次方言內部的交叉比對，可見「填滿、充滿」的本字應當來自全濁上聲而非全濁去聲。這也就是說，中古全濁定母去聲的「滇」（堂練切）字其實也無法解釋現代泉州和潮州方言中陽上調 tĩ4 的讀法。

歸納以上的討論，根據閩南語內部比較，表示「填滿、充滿」的語詞，其本字應當來自一個中古全濁聲母上聲字。韻母方面，閩南語各次方言都讀為 -ĩ，其可能的範圍是中古咸攝的三四等或山攝的三四等，並且我們可以進一步排除梗攝二、三、四等。理由是：梗攝二、三、四等在泉州系和潮州系的韻母規則對應雖然也是 -ĩ，但是漳州系則能夠區別咸、山兩攝與梗攝：咸攝細音（簾染添拈）和山攝細音（錢纏天年）韻母今讀為 -ĩ，梗攝韻母（坑生井青）今讀則為 -ɛ̃，與 -ĩ 截然有別。現在已知漳州表「填滿、充滿」的讀音為 tĩ6（< *tĩ4），則其本字無疑地只能在咸、山兩攝細音字群中尋求。

前此學者對閩南語 tĩ4/tĩ6 本字的探索，主要著眼於山攝的細音字（如堂練切的「滇」或徒年切的「闐」），兩字共同的問題是聲調上並不規則，形成例外。我們認為，閩南語 tĩ4 的本字應當是「潭」字，也就是楊秀芳（1982）最早提出的見解。根據《廣韻》，「潭」的釋義如下：

[11] 漳州根據馬重奇（1993），永春根據林連通、陳章太（1989），泉州根據林連通主編（1993），潮汕揭陽根據蔡俊明（1976）。

[12] 李如龍（2001: 40）南安方言本字考證中以去聲「滇」字「調轉為陽上」，未說明原因。

潭　徒玷切，潭㴑，水滿。

較為可惜的是，「潭」字除了《廣韻》收錄字音及釋義之外，在漢語文獻中不容易見到確切的用例。同時《廣韻》以「潭㴑」兩字連言，似乎顯示這是個連綿詞。不過《說文解字》「㴑」字下有「泥水㴑㴑」，其中「㴑」字疊用，而非「潭㴑」並舉。因此「潭㴑，水滿」的句讀也可能是「潭、㴑，水滿」。

由於「潭」字在漢語典籍上幾乎沒有例證，因此閩南語 tĩ4/6 本字的考求，除了《廣韻》釋義之外，必須仰賴音韻上嚴整的規則對應。徒玷切為咸攝開口四等定母上聲忝韻字，聲母屬全濁，韻母為咸攝細音，聲調為上聲。漢字「潭」的聲、韻、調完全符合演變到閩南語的音韻規則對應。現在列出泉州、漳州、揭陽三個閩南語次方言的咸攝開口四等字的同源詞：

表 4. 三種閩南語咸攝四等字同源詞

	添	甜	拈	潭
泉州	thĩ1	tĩ1	lĩ1	tĩ4
漳州	thĩ1	tĩ1	lĩ1	tĩ6
揭陽	thĩ1	tĩ1	lĩ1	tĩ4

以上同源詞中，「添」thĩ1 用於「添飯」或「添衫」（多穿衣服）；「甜」tĩ1 表示味道甘甜，兩字都是口語常用字。至於「拈」lĩ1，奴兼切，以指取物也。閩南語的 lĩ1 正是指用手指頭輕巧地拿取物品，例如「偷拈」thau1 lĩ1。值得留意的是，咸攝四等定母平聲「甜」和泥母平聲「拈」，它們的聲調都不讀為陽平，而仍讀為陰平，這一現象後文將有所說明。「甜」在泉州、漳州和揭陽等都有 tiam2 一讀，從韻母和聲調來看，屬於文讀音的表現。「拈」也有 liam1 一讀，用於前往寺廟進香或亡者靈前上香，例如「拈香」liam1 hiũ1，聲調也讀為陰平。以閩南語咸攝四等開口字的層次而言，讀 -iam 者屬於文讀層韻母，讀 -ĩ 者則屬於白話層韻母。有了「添甜拈」等字讀 -ĩ 的韻母規則對應，我們便可以放心地把閩南語中表示「填滿、充滿」的謂詞 tĩ4/tĩ6 與咸攝開口四等徒玷切的「潭」字聯繫起來。

我們以咸攝四等「潭」字為閩南語 tĩ4/tĩ6 的語源，就閩南語內部而言可以全面地解釋聲母、韻母以及聲調上的對應關係，它在原始閩南語的形式為 *tĩ4。根據歷史語言學比較方法的基本原則，「添甜拈潭」等同源詞在原始閩南語的形式只能追溯到鼻化韻*-ĩ，同時無法重建出任何形式的輔音韻尾。不過若是參照其他閩語系語言的同源詞，則可望

重建這些鼻化韻更早期韻尾的樣態。接著我們考察閩東語的同源詞來加以比較，同時進一步驗證「潭」這個本字是否可靠。

關於閩東語的早期形式，秋谷裕幸（2018）及我們（吳瑞文 2018）都曾有過研究。兩者不約而同地指出咸攝四等陽聲韻在閩東語更早的歷史階段中兩種形式：一種是有帶 -i- 介音的 *-iɛm（秋谷裕幸）或 *-iem（吳瑞文）韻母，另一種則是不帶任何介音的 *-ɛm 韻母。[13] 其中與原始閩南語 *-ĩ 相應的音韻層次為 *-iɛm，同時更值得留意的是，原始閩東語與原始閩南語的同源詞大致是重疊的。請看下表：[14]

表 5. 五種閩東語及原始閩東語的咸攝四等字同源詞

	虎浿	咸村	九都	福清	柘榮	原始閩東
添	thiem1	thim1	them1	thieŋ1	thieŋ1	*thiem1
甜	tiem1	tim1	tem1	tieŋ1	tieŋ1	*tiem1
拈			nim1	nieŋ1	nieŋ1	*niem1
潭[滿]	tiem6	tim6	tim6	thieŋ6	thieŋ6	*tiem6

從上表來看，有幾個地方值得留意：

第一、虎浿、咸村及九都這三種寧德次方言，「添、甜、潭」三個同源詞都收雙唇鼻音 -m 尾，在福清、柘榮這類方言則收舌根鼻音 -ŋ 尾，可見原始閩東語應當具有雙唇鼻音 *-m 韻尾，-m 韻尾目前只保留在寧德方言中，其他閩東語次方言都已經變為舌根鼻音 -ŋ。九都的「潭[滿]」韻母為 -im 與「添、甜」的 -em 不同，這是由於原先的 *-iɛm 韻母以聲調為條件發生分化的結果，參看秋谷裕幸（2018: 550–551）。

第二、秋谷裕幸擬測的原始寧德方言聲調系統，共有陰平、陽平、上聲、陰去、陽去、陰入、陽入共七個聲調，其中陽去調包括中古的濁上字和濁去字，也就是濁上歸去。因此從原始寧德方言來說，「潭」讀為 *tiɛm6 屬於規則對應。至於其他閩東語，如福清和柘榮都讀 tieŋ6（＜*tiem6），同時現代閩東語中似乎也沒有能夠區分陽上和陽去的次方言。所以我們可以說，原始寧德方言的聲調系統大致等同於原始閩東語的聲調系統。

[13] 需留意的是秋谷裕幸（2018）擬測的是原始寧德方言，我們（吳瑞文 2018）所擬測的則是原始閩東語，範圍頗有不同。從音韻層次的觀點來看，中古咸攝四等「點念店簟」這些同源詞在兩人各自的語音系統內都是單元音*-ɛm。

[14] 下表中虎浿、咸村和九都都根據秋谷裕幸（2018: 549），同時放入福清、柘榮以及原始閩東語進行比較。請留意秋谷並未寫出寧德方言中「甜」*tiɛm1 和「滿」*tiɛm6 兩詞的本字，「甜」字也許是基於聲調演變上的考慮。關於「甜」這個本字的認定問題，下文有說。另外，奴兼切的「拈」字也是我們補入的。

第三、秋谷裕幸（2018）所擬測原始寧德方言中沒有「拈」這個同源詞，因此「拈」是否收 -m 尾似乎不無疑問。我們參考沙平（1999）所記錄的寧德方言，發現咸攝四等同源詞有「添」thɛm1、「甜」tɛm1、「拈」nɛm1 三字的讀音。這三個同源詞讀音與寧德九都的讀音類似，都是不帶介音的韻母。由此可知「拈」在寧德方言內部確實有 nɛm1 一讀。進一步比較寧德「拈」nɛm1 和福清、柘榮的「拈」nieŋ1，可以確認「拈」nieŋ1 無疑地來自早期帶 -m 韻尾的 *-iem。九都「拈」讀 nim1，韻母跟「添甜」讀 em 不同，暫時視為例外。

第四、原始閩東語的「甜」*tiem1 和「拈」*niem1 在聲調上都讀陰平，與原始閩南語的 *tĩ1 和 *lĩ1 形成嚴整的規則對應。從中古音的觀點來看，「甜」是徒兼切，「拈」是奴兼切，均屬所謂帶音的濁聲母。在聲調演變上，濁母平聲應該變入陽平，讀為陰平似乎相當奇怪。宏觀來看，現代閩語中「甜、拈」兩字在聲調上一致的例外變化，符合丁邦新（2002）所提到的方言特字。這兩個特字的成因，我們推測是原始閩語平分陰陽之後，未曾變入陽平而仍保留為陰平。換言之，閩語「甜、拈」兩字讀陰平，其本質是音變的遺留。[15]「甜、拈」這兩個詞來自中古濁聲母平聲，然今讀陰平而不歸陽平，正是閩東語和閩南語關係格外密切的一項音韻證據。[16]

總結本節所述，現代閩南語中表示填滿、充滿或潮水滿漲的 tĩ4/tĩ6，本字應該是咸攝開口四等定母上聲徒玷切的「簟」，本義是水滿。光就閩南語內部而言，觀察韻母無法判斷究竟是來自山攝的「滇」（堂練切）或咸攝的「簟」，只能在聲調上根據泉州系及潮汕系方言今歸陽上的表現，認定本字應該是「簟」而非「滇」。就這一個本字考證而言，現代閩東語提供了相當重要的語音線索，在原始閩東語及原始寧德方言中，表示填滿、充滿的詞為 *tiem6 或 *tiɛm6，這個語音形式本身說明其語源果然是來自咸攝細音「簟」字而非山攝細音「滇」字。附帶一提，Douglas（1990[1873]: 493）記錄到 tsui3 tiam6 tĩ6

[15] 中古所謂的次濁聲母（明、微、泥、娘、日、疑）類聲母在聲調演變上與全濁聲母一項顯著的不同，在於調分陰陽之後全濁聲母讀為陽調，次濁聲母則因為調類不同而有差異。以「濁上歸去」在華語的表現為例：全濁上和全濁去今讀全混，因此全濁上「靜」與全濁去「淨」同讀為 tɕiŋ5。次濁上則是上聲仍讀上聲，次濁去讀去聲，例如次濁上「忍」ʐən3 與次濁去「認」ʐən5 聲調不同。回到我們對閩語的討論，也許有人認為次濁聲母對於聲調歸讀的影響似乎也不必然就是陽調，採「音變遺留」來解釋次濁聲母語詞的陰陽分調是否恰當？從「調分陰陽」的角度來看，閩語某些次濁聲母既不與全濁聲母一起變入陽調，就「濁」聲母而言，次濁聲母留在陰調，這就是我們所說「音變遺留」的內涵。至於何以遺留，也許是詞彙擴散過程之間中斷使然，這個問題值得蒐集更多語料並賦與更充分的解釋，本文暫時從略。

[16] 審查人提到，在分陰平與陽平的漢語系語言中，「甜」歸入陰平的極少。我們同意這個觀察。這恰好顯示：就「甜」這個常用詞而言，閩語與其他漢語系語言（官話、吳語、客語、粵語、贛語、湘語）的表現不同，同時在聲調上表現為存古（不變入陽平）。另一個假設是：閩語的「甜」與其他漢語系語言的「甜」的來歷不同，不過我們不採取這樣的主張。

[tsúi tiām-tĩⁿ]（潮水漲滿）一詞，tiam6 tĩ6 的本字其實正是「潭潭」，這個複合詞內部的兩個成分分別來自兩個不同的音韻層次：tiam6 是文讀層，tĩ6 是白話層。

4. 閩南語引誘義和招來義動詞 siã2 的本字

閩南語中表示「引誘」義或「招來」義的動詞，其讀音為 siã2。siã2 在閩南語中是個相當常見的口語詞。用例如下：（以方括號 [ ] 標明語義）

（14） *a1* *biŋ2* *iŋ6* *thŋ2* *a3* *siã2* *a1* *iŋ1*
阿 明 用 糖 囝 [引誘] 阿 英
阿明用糖果引誘阿英。

（15） *tshau5* *tsho1* *siã2* *sin2*
臭 臊 [招來] 蠅
腥臭招來蒼蠅。[17]

從以上例句可以發現，siã2 的引誘義或招來義這個用法，在句子中後面都必然帶著一個賓語（a1 iŋ1、sin2），構成一個「述賓結構」。尤其值得注意的是，siã2 所接的賓語還可以透過引介受事成分的介詞 ka6 放在述語動詞之前，例如：siã2 i1（引誘他）可以轉換為 ka6 i1 siã2。由此可見，閩南語表示「引誘」義和「招來」義的 siã2，就詞性而言是個標準的及物動詞。

關於閩南語 siã2 的本字，也存在相當分歧的看法：廈門市地方志編纂委員會辦公室（1996: 78）寫作「餳」，李如龍（2001: 19, 87）寫作「贏」，莊初升（2002: 53）寫作「營」，教育部《臺灣閩南語常用詞辭典》則寫作「啞」[18]。陳祐禎（2016）相當全面地檢討了以上諸多本字的中古音來歷及語義，同時納入閩語內部次方言「引誘」義動詞的詞形進行比較。陳祐禎（2016: 162）結論認為：「引誘」的語源，以「涎」字的可能性最大。最近，謝忠晟（2021: 9）重新檢討閩語中「引誘」義動詞的本字，懷疑本字當是「豔」。[19] 以

[17] 本條根據 Douglas（1990[1873]: 426）：[chhàu-chho siâⁿ-sîn, to entice young men, as a gaudily ornamented bad woman (lit. strong-smelling fish alluring flies).] 對於字面上的意義及其引申義，Douglas 已有充分的說明。

[18] 根據《臺灣閩南語常用詞辭典》線上資源 https://twblg.dict.edu.tw/holodict_new/，檢索日期 2023/2/10。

[19] 謝忠晟（2021: 1–12）未出版，該文稿係謝同學修習本人 2021 年春天於國立政治大學中文系開設之【閩客語比較專題研究】的課堂期末報告。在本文撰寫間已徵得謝同學之同意後始引用例句，至於關於形態的

「豔」字為閩南語「引誘」義動詞的本字最為晚出，也最具啟發性。然而不可否認，「豔」字本身存在音韻規則對應上的問題。下文將進一步說明「豔」的音韻規則對應及與之相關的漢語詞彙形態變化。

在進入「豔」字的討論之前，首先從閩語次方言音韻對應的觀點，通盤檢討前人所提「餳、贏、營、涎、唌」等字之所以不能成立的原因。Norman（1981）利用八個現代閩語次方言來擬測原始閩語（Proto Min）的韻母系統。在這個系統中，表引誘的動詞（lure v.）屬於原始閩語的同源詞，另一個重要的口語同源詞則是「饗」（子冉切，食薄味也，insipid）。列表如下：

表 6. Norman 原始閩語 *-iɑm 韻母同源詞

*iɑm	福安	福州	廈門	揭陽	建甌	建陽	永安	將樂
lure v.	siɛm2	—	siã2	—	tshiaŋ5	siaŋ2	—	siaŋ9
insipid	tsiɛm3	tsiaŋ3	tsiã3	tsiã3	tsiaŋ3	liaŋ3	tsiɔ̃3	tshiaŋ9

從以上八個閩語次方言的比較來看，原始閩語中的引誘義動詞，其本字應該來自早期以雙唇鼻音 -m 結尾的 *siɑm [20] 這兩個同源詞主要來自中古咸攝。[21] 從同源詞的角度來看，福安方言的 siɛm2 提供了最為關鍵的證據。現在回頭來看「餳、贏、營、涎、唌」這幾個字的中古來歷：

餳　徐盈切　梗攝開口三等清韻邪母平聲
贏　以成切　梗攝開口三等清韻以母平聲
營　余傾切　梗攝合口三等清韻以母平聲
涎　夕連切　山攝開口三等仙韻邪母平聲
唌　徒干切　山攝開口一等寒韻定母平聲

具體分析則為本文所原創。

[20] 同源詞表中建甌方言的引誘義動詞聲母讀為 tsh-，與其他閩語次方言不同。李如龍、潘渭水（1998: 194）收 tshiaŋ6，義為招惹、逗引，並認為本字是「靚」（疾政切，《說文》：召也）。可見建甌 tshiaŋ5 的來歷不無疑問。從同源詞表現來看，建甌表招惹逗引的 tshiaŋ5/6，聲母不僅與閩南、閩東不同，也與閩北建陽和閩中永安有別。以母讀 tsh- 在閩語（例如閩南語「延」tshian2、「颺」讀為 tshiũ2、「拽」讀為 tshua6）固然並非罕見，但閩北建甌 tsh- 是否就是這項規則的產物，由於閩北閩南各自有內部對應，同時建甌又異於其他閩北方言，我們暫時把建甌的讀音視為例外，以求審慎。排除建甌之後，引誘義動詞在原始閩語中的聲母擬測為 s- 當無疑問。

[21] 參看我們（吳瑞文 2018）對咸攝三等韻的層次分析。

歸納起來，「餳、贏、營」三字均來自梗攝，中古時期韻尾是 *-ŋ，在原始閩語中韻尾也是 *-ŋ。「涎、唌」兩字來自山攝，中古時期韻尾是 *-n，在原始閩語中韻尾也是 *-n。由此可知，以上這五個候選的本字，從音韻規則對應上來看，韻尾成分不符合規則對應。附帶一提，依照音韻對應關係，一等徒干切的「唌」在閩南語中不讀為 s-，韻母也不讀為 -iã，顯然更不會是閩南語「引誘」義的本字。[22]

從比較閩語的觀點來看，原始閩語中「引誘」義動詞的形式，韻母毫無疑問地可以擬測為 *-iɑm。我們認為「豔」是可能的候選本字，現在從音韻的觀點進行論證。根據《廣韻》：

豔　以贍切，美色也。

以贍切，咸攝開口三等鹽韻去聲以母字。從閩南語的音韻規則對應來看，咸攝開口三等有三個明顯的音韻層次：（以臺灣閩南語為例，下同）

層次 I 為 -ĩ
簾lĩ2、櫼tsĩ1、染lĩ3、鹽名詞，醃製品sĩ2、鹽動詞，醃製sĩ6、鉗khĩ2。
層次 II 為 -iã
饗tsiã3、焰iã6、豔iã6、厭ia5（< iã5）。
層次 III 為 -iam
廉liam2、尖tsiam1、染liam3、鹽名詞，調味料iam2、焰iam6、豔iam6。

其中層次 I 和層次 II 屬於白話音，層次 III 則為文讀音。因此以 siã2 的韻母來自咸攝三等沒有任何困難，且讀音性質屬白話音。聲母部分，中古以母至少有以下三套規則對應：

層次 I 為 ts-
簷tsĩ2、癢tsiũ6。
層次 II 為 s-
鹽名詞，醃製品sĩ2、鹽動詞，醃製sĩ6、蠅sin2、翼sit8、液sioʔ8。
層次 III 為零聲母
鹽名詞，調味料iam2、養ioŋ3、有iu3、引in3、用iŋ6、蠅iŋ2、翼ik8、液ik8。

[22] 考量到徒干切這個切語，在用字上選擇「唌」作為閩南語口語詞 siã2 的書寫形式，恐怕也頗為勉強。

整體看來，中古以母在閩南語中大致有三個音韻層次，分別讀為 ts-、s- 和零聲母；其中讀為舌尖塞擦音 ts- 或擦音 s- 的，都屬於白話音，讀為零聲母的則是文讀音。歸納以上關於聲母和韻母的規則，中古咸攝開口三等以贍切的「豔」字，聲母讀為 s-，韻母讀為 -iã，符合閩南語內部音韻表現，唯一的問題是聲調。次濁去聲在閩南語應該讀為陽去調（6），但今讀為陽平調（2）。「豔」字在聲調上的不規則，對本字認定形成阻礙。要解釋「豔」在閩語中聲調的特殊表現，我們認為可以從「豔」這個詞彙的形態變化著手。

形態學（morphology），又稱詞法學或構詞學，是語言學領域的一個分支。形態學主要研究詞彙的內部結構與外部形式，以及詞彙生成和轉化等課題。語言中的詞彙藉由語音呈現，因此語音是詞的外部形式。相對於外部形式，詞彙還有它的內部結構，具體內涵包括詞性和語義。詞性語義（內部結構）透過語音（外部結構）始得以表情達意，從而發揮溝通的作用。一個詞彙只要內部結構（詞性語義）發生變化，便產生了新詞，也就是形態變化。進一步觀察內部結構與外部形式兩者的關係，一個詞彙的內部結構若發生了變化，其效果或者造成外部形式的改變，也或者不造成改變。詞彙由於內部結構變化而造成語音變化者，稱為「以音別義」；內部結構雖變化但不改變外部形式者，則稱為「不以音別義」。[23] 底下以「門」和「女」這兩個詞彙為例，對漢語形態的內部結構與外部形式進行簡要的說明。[24]

關於「門」，《左傳・襄公十年》載：

庚午，圍宋，門于桐門。
杜預注：不成圍而攻其城門。

「門于桐門」一句中有兩個「門」字，「桐門」的「門」是名詞，也就是中心語，受前置定語「桐」所修飾。第一個「門」是動詞，意思是「攻打城門以得通行」。介詞「于」所引介的「桐門」為處所賓語，由此可知「門」是個不及物動詞。同一個「門」字具有動詞和名詞兩種語義及詞性，可見形態發生了變化。

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[23] 參看楊秀芳（2013；2017）。漢語上古音的一個研究重點在於透過典籍上的音韻交替現象找出構詞的痕跡，這類研究重點在於詞綴形式的擬測，例如表示使動的 *s- 前綴或表名物化的 *-s 後綴。可參看 Mei（2012）和 Baxter & Sagart（2014）。本文從漢語形態來探究閩南語本字問題，關注重點在於現代方言的實際用法，以及這些用法在漢語文獻中是否有所徵，暫時不涉及個別詞綴的構擬。應當留意的是，現代方言中以音別義的形態變化，不見得都能追溯到古代漢語，也就是不能排除是方言自身後起的這個可能。以四聲別義而言，現代北京話中就有不少後起的例證，例如：「把」的把持義（動詞）讀上聲 bǎ，手把持處（名詞）讀去聲 bà，《廣韻》只收上聲博下切，並無去聲切語；更多例證參看周祖謨（1966: 114–116）。

[24] 「門」字例句及論述依照楊秀芳（2013）。「女」字論述則依照楊秀芳（2017），例句是我們自己提出的。

關於「女」,《尚書・堯典》載：

女于時，觀厥刑于二女。
女，妻；刑，法也。堯於是以二女妻舜，觀其法度，接二女以治家觀治國。
《經典釋文》：女于之女，而據反。

這段文字中出現兩個「女」字。第一個「女」字釋為「妻」,「時」是指示代詞，指舜，未出現的主語則是堯。「女于時」是指堯把兩個女兒嫁給舜，這裡的「女」是個不及物動詞。《經典釋文》同時指出用作動詞的「女」字，讀音為而據反，也就是日母去聲。至於第二個「女」字並無音注，可推測為慣用的「如字」讀，也就是上聲的尼呂反，其意為女性、女子，是個名詞。由此可知,「女」有名詞和動詞兩個不同的語義和詞性，形態有異。歸納起來,「門」與「女」在內部結構上都有名詞與動詞的形態變化，這是它們相同之處。不同之處則是：「門」的外部形式沒有發生變化，也就是「不以音別義」；[25]「女」的外部形式則存在上聲和去聲的區別，也就是「以音別義」。

漢語方言中存在若干無法用歷史音變規律解釋或在語音形式上呈現若干出入的詞彙，可能就是該詞彙在歷史上發生了形態變化並且「以音別義」，此後遂造成語源（本字）辨識上的困難。這類現象必須擴充我們對漢語詞彙形態變化的知識，才可望獲得解決。底下我們從漢語歷史文獻資料來考察「豔」這個詞的語義詞性，並說明它如何演變為現代閩南語的「引誘」義動詞 siã2（< *siɑm2）。

根據《說文解字》：

豔，好而長也。从豐，豐，大也；盍聲。《春秋傳》曰：「美而豔」。
段玉裁注：小雅毛傳曰：美色曰豔。方言：豔，美也。宋衛晉鄭之閒曰豔。美色爲豔。……。
左傳兩言美而豔，此豔進於美之義。人固有美而不豐滿者也，毛傳及方言皆渾言之也。[26]

由此可知,「豔」本義是美豔、豔麗，而且在語義內涵上比「美」更豐富，也就是段注所說「豔進於美」。例如《左傳・文公十六年》：

[25] 這個判斷的根據在於,《經典釋文》沒有為不同語義詞性的「門」注出相異的讀音。「門」字反切為莫奔切，在漢語文獻中也沒有其他讀音。

[26] 典籍「艷、豔」二字古相通，凡引漢語典籍都遵照原文不加更改。本文行文時則一律作「豔」。

公子鮑美而豔。

就用法來看，「美而豔」中的「豔」是不及物狀態動詞，用來描寫主語（公子鮑）的樣貌。

「豔」在漢語典籍中還有「以某事物為豔、為好」的意動用法。例如《韓非子・外儲說左上》：

夫不謀治強之功，而豔乎辯說文麗之聲。

這段話是說：人主不去謀畫治國強邦的策略，卻去崇尚巧辯美好的說法（以辯說文麗之聲為豔），長此以往會使得國家無法有效治理。從句法結構來看，「豔乎辯說文麗之聲」中「所以為美」（也就是所崇尚、所欣羨）的客體必須利用「乎」這個成分來引介，由此可見「豔」應當分析為一個不及物動詞，不過它可以透過介詞引入另一個跟動詞在語義上有關的論元。

「豔」在漢語典籍中還有「貪戀、愛慕或歆羨」的用法。例如《淮南子・精神訓》：

獻公豔驪姬之美而亂四世。

這段話是說：晉獻公由於貪戀驪姬的美色，從而造成晉國長達四世的紛亂。句中「豔驪姬之美」是個述賓結構，「驪姬之美」為受事賓語，可見「豔」無疑地應分析為一個及物動詞。

「豔」在典籍中還有使動的用法，意思是「使某貪戀，使某歆羨」。例如《禮記・郊特牲》：

季春出火，為焚也。然後簡其車賦，而歷其卒伍，而君親誓社，以習軍旅。左之右之，坐之起之，以觀其習變也；而流示之禽，而鹽諸利，以觀其不犯命也。
鄭玄註：流猶行也，行，行田也。鹽讀為艷。行田示之以禽，使歆艷之，觀其用命不也。謂禽為利者，凡田，大獸公之，小禽私也。[27]
《經典釋文》：鹽，依注音艷。

[27] 這個例句引用自謝忠晟（2021）的期末報告，特此說明。

這段文字說明春天焚萊之後，要陳列出兵車數量，並檢閱各地兵卒部伍。國君親自參加田獵，以熟悉軍旅的情況，同時田獵所得的獵物可用於祭社。國君在操練部伍時，藉由往左往右，坐下起立這些指令，觀察部伍是否熟悉戰陣變化。並且在行田禮時，於軍陣部伍的前方驅趕小禽，用這些小禽來使部伍產生貪羨之心，進而觀察部伍是否能夠不干犯國軍的命令。這段文字中的「鹽諸利」，在句法結構上可以解析為「鹽之以利」，「諸」是「之以」兩字合音。[28]「鹽之以利」的「之」指的是軍旅部伍，主語則是承前的君。「鹽之以利」就是「豔之以利（以利豔之）」。鄭玄註「鹽諸利」是使歆豔之，充分說明這裡的「鹽」（豔）乃是一個使動動詞，帶有使動賓語（之）。根據漢語文獻的線索，可以清楚發現「豔」歷經了由不及物到及物，由主動到使動的派生歷程。

在語音表現上，東漢鄭玄的註也相當值得重視。《禮記》原文寫作「鹽諸利」，「鹽」字本身有平聲余廉切、去聲以贍切兩讀。這裡需要推敲的是「豔」與「鹽」兩字字形迥異，典籍上卻存在「讀為」的訓解關係，這與兩字的音、義有關。

在字音方面，「豔」在典籍上向來只有去聲以贍切一讀；「鹽」在典籍上則有平聲余廉切和去聲以贍切兩讀。從語義派生的角度來說，「鹽」的兩讀中，平聲為名詞（鹽巴），去聲為動詞（用鹽醃製），也就是說，「鹽」的兩讀是以平、去兩讀來區別語義。孫玉文（2015: 1560）以平聲的「鹽」是原始義，去聲的「鹽」為滋生義，我們接受這個看法。由此可知：在字音上，「鹽」有平聲和去聲兩讀，而以平聲為原始義，去聲為滋生義；「豔」僅有去聲一讀。

《禮記》經文「鹽諸利」在鄭玄所處的東漢時期，已經必須標出讀音同「豔」（去聲），這個注解本身暗示了一種可能性，那就是：「豔」當時已派生出平聲讀法，《禮記》以「鹽」字來寫乃是取「豔」的平聲讀法。不過當時經師（如鄭玄）知道，這段文字在語義上其實跟「豔」密切相關，跟「鹽」（不論是平聲或去聲）實在沒有牽連，因此用語義相關的語詞加以訓解。這裡應該說明的是鄭玄「讀為」一詞的內涵。段玉裁〈《周禮漢讀考》序〉對「讀為」的解釋為：

[28] 「諸」作為「之以」的合音，在早期漢語文獻中例證頗多。如《論語・學而》：「告諸往而知來者」是「告之以往而知來者」，也就是「把過去的事告訴他，就知道接下來的事」。又《論語・陽貨》：「色厲而內荏，譬諸小人，其猶穿窬之盜也與？」這裡「譬諸小人」是「譬之以小人」，也就是「拿小人來打比方」。又《禮記・文王世子》：「師也者，教之以事而喻諸德者也」，「喻諸德」是「喻之以德」，跟「教之以事」是平行的結構。

讀為、讀曰者，易其字也。易之以音相近之字，故為變化之詞。……變化主乎異，字異而義了然也。

段玉裁指出，漢儒注解中的「X 讀為 Y」，係透過改易為音近之字來具體說明語義；換言之，「讀為」一詞是用來闡明某種變化的訓詁用語。根據劉文清（2022: 93, 100–101）的考察，「讀為」用於「通假釋義」及「模擬語音」，並且在鄭玄關於三禮及毛詩的注解中，有「標示本字以別音義」的功能。

回到「鹽諸利」這句，我們推測經師相當重視「豔」在音韻上「以音別義」這個構詞手段，因此書寫上以平聲「鹽」來表現去聲「豔」所派生出來的平聲異讀。然而，當時不少研讀經書的學子看到「鹽諸利」一句，固然讀成了去聲「豔」字所派生出的平聲讀法，然而從字形上反而不易理解語義上「鹽諸利」的這個「鹽」字。因此鄭玄以「鹽讀為豔」為注，說明「鹽」在語義上與「豔」有關，所謂「字異而義了然也」。這個推論另有一個旁證：在陸德明《經典釋文》中，「鹽」的平聲讀法屬於「如字」讀，也就是最普遍的讀法。以這個通行讀音來看，「鹽諸利」之「鹽」不但語義難解，兼且語音略異，這也就是「鹽」在這個語境中需要注解的理由。依照文獻表現來看，《禮記》中已經存在「鹽/豔」兩字的通假關係，東漢已經需要解釋，可以推測「豔」之有平聲（余廉切）一讀，其時代至少可以追溯到東漢之前。

歸納起來，「豔」在漢語歷史文獻中的語義詞性及讀音，可呈現於下：

豔1（不及物狀態動詞）→	豔2（不及物意動動詞）→	豔3（及物動作動詞）→	豔4（及物使動動詞）
以贍切	以贍切	以贍切	余廉切（寫作鹽）

從形態變化的角度來看，在典籍中豔 1、豔 2 和豔 3 都沒有特別標出讀音，可以推測它們都讀作去聲的以贍切。換句話說，這三種用法之間「不以音別義」。在派生出使動用法（豔 4）時，「豔」進而改讀為余廉切，並且在典籍中借用「鹽」的字形來書寫。由此可知，使動動詞豔 4 跟其他三種用法彼此「以音別義」，在外部形式（聲調）上有了區隔。根據以上的討論，儘管「豔」在早期音讀資料中只著錄「以贍切」一讀，但從形態變化的觀點來看，由「豔」（豔 1）所派生的詞彙有「以贍切」（豔 2、豔 3）和「余廉切」（豔 4）這兩個聲、韻相同，聲調有異的讀音。

從語義內涵來推敲，使動用法的「豔 4」，在句法結構上都帶著使動賓語，構成述賓結構：「豔某」是「使某產生豔羨之心」，這是迂迴的說法，直接陳述就是「引誘某」。閩

南語「用糖囝 siã2 阿英」（用糖果引誘阿英）這個句子中，siã2 是使動動詞，「阿英」則是使動賓語。閩南語「用糖囝 siã2 阿英」與《禮記》「鹽諸利（鹽之以利）」，它們內部的組成成分基本上是相同的，不同之處是成分之間的線性次序：《禮記》介詞組 [以利] 放在述語之後，閩南語的介詞組 [用糖囝] 放在述語之前。從音韻的角度來看，讀為余廉切的「豔」，正是閩南語 siã2 的語源（本字）。從本字的觀點來說，「豔」形態變化之後進一步「以音別義」，聲調也從原本的去聲改讀平聲，現代閩南語及絕大多數閩語繼承的是「豔」的平聲讀法，在原始閩語階段的讀音為 *siɑm2。「引誘」義動詞 *siɑm2 演變到現代閩語次方言，諸如：福安 siɛm2、廈門 siã2、永安 siaŋ2、將樂 siaŋ9，聲調也都反映為陽平或陽平乙。[29]

秋谷裕幸（2018: 541）所擬測的原始寧德方言中也收有「引誘」一詞，但並未標出其本字。不過就寧德虎浿方言讀 θiem2 和九都方言讀 siem2 來看，也都可以追溯到平聲余廉切的「豔」。咸村「引誘」義動詞讀 ɕiɛm5，聲調反映為陰去調，似乎不符合規則。事實上原始寧德方言中的陰去調中，有不少同源詞是中古次濁聲母去聲。例如：罵*ma5、墓*muo5、瀨*lua5、鹽醃製*θiam5、硯*ŋian5、讓*niɔŋ5、夢*mœŋ5。（秋谷裕幸 2018: 705）根據以上成系統的音韻對應，我們推測咸村「引誘」義動詞讀 ɕiɛm5，其實是「豔」在形態變化後仍讀去聲（以贍切）的讀法，也就是語音形式上「不以音別義」，現象上較為保守。[30] 由咸村 ɕiɛm5、虎浿 θiem2、九都 siem2 及其他閩語的讀音來看，在原始閩語時期，「引誘」義的「豔」極有可能已經存在 *siɑm2 和 *siɑm5 兩讀，閩東寧德咸村選擇了去聲讀法，閩東寧德虎浿、九都及其他多數閩語則都選擇了平聲讀法。

掌握了「豔」在漢語文獻中的形態派生現象，也有助於我們了解現代閩南語口語中「豔」的用法。從歷史發展來看，「豔」siã2 在閩南語中的「引誘」義是使動動詞的具體表現。「豔」siã2 另一個常見的動詞用法是「招來」義，這個用法是在「引誘」義的基礎上進一步發展的結果。當閩南語的「豔」siã2 體現在一個句法結構中，如果主語和賓語都是有生命且是人 [+animacy, +human]，「豔」siã2 會被理解為「引誘」義；當賓語是有生命但非人 [+animacy, -human] 時，「豔」siã2 則會被理解為「招來」義。例如：

[29] 現代閩語各次方言「引誘」義動詞的諸多讀音，可參看陳祐禎（2016）的整理，它們也都可以追溯到原始閩語的 *siɑm2。

[30] 蒙審查人指出，寧德咸村方言「豔」讀 ɕiɛm5，這個方言的 ɕ- 來自 tɕh- 甚至 h-。不過我們翻檢秋谷裕幸（2018: 428–429），現代咸村方言中發生 *h > tɕh > ɕ 這項變化的可靠同源詞包括「兄、香、鄉、享、響」，可以留意到全部都是曉母字；然而「豔」中古屬於以母，考量到古音來歷，不宜一概而論。

（16） *a1* *biŋ2* *iŋ6* *bi3* *siã2* *kue1*
阿 明 用 米 豔 雞
阿明用米把雞招來。

以上例句中主語「阿明」a1 biŋ2 為有生命且是人，賓語「雞」kue1 為有生命且非人，原有的使動述賓結構「豔雞」siã2 kue1（使雞有貪慕之心）在這個語境中就獲得「把雞招來」的意義。再看以下例句：

（17） *tĩ1* *e2* *e6* *siã2* *kau3* *hia6*
甜 其 解 豔 狗 蟻
甜的會招來螞蟻。

以上例句位居主語的名詞成分「甜其」tĩ1 e2 是個無生命 [-animacy] 名詞。在這類語境中的述賓結構「siã2 kau3 hia6」（豔狗蟻），它和「thai2 si1 kue1」（「治西瓜」）這類及物動作動詞加上受事賓語所構成的述賓結構完全一致。於是「豔」siã2 開始可以分析為普通的及物動詞，賓語「狗蟻」kau3 hia6 也就被視為受事賓語。由此可見，「豔」siã2 之有「引誘」義和「招來」義，其實取決於賓語和主語的語義徵性。

5. 結論

本文考證三個中古屬於咸攝的臺灣閩南語口語詞，分別是：表兼有、含有、帶在身邊動詞「銜」kã2；表示充滿、填滿義的形容詞「潭」tĩ6；以及表示引誘義或招來義的動詞「豔」siã2。從原始閩語到臺灣閩南語，以上這三個同源詞的演變是：

銜，戶監切　原始閩語 *kɑim2 > 原始閩南語 *kã2 > 臺灣 kã2
潭，徒玷切　原始閩語 *tiam4 > 原始閩南語 *tĩ4 > 臺灣 tĩ6
豔，余廉切　原始閩語 *siɑm2 > 原始閩南語 *siã2 > 臺灣 siã2

要找出這些閩南語口語詞的漢語語源，首先面臨的困難是：咸攝下不少韻目在原始閩南語白話層次已經成為鼻化音，這使得它們與收 -n 尾（山攝）或 -ŋ 尾（梗攝）的韻目不

容易區別，進而導致「覓字」上的偏差。因此從事閩南語本字研究，除了閩南語內部的交叉比較之外，還應該參考其他閩語（例如閩東語和閩北語）的表現，也就是透過「尋音」來幫助我們判斷韻攝的正確歸屬，從而在諸多候選字中找出最合宜而準確的本字。

漢語的形態變化相當豐富，若是一個語詞產生形態變化後又「以音別義」，相當程度也會在辨認本字上構成阻礙。本文關於閩南語「豔」siã2 的考證，仰賴詳細考察漢語文獻中呈現的形態變化，關鍵在於認識到「豔」派生為使動動詞之後，聲調上會由去聲以贍切改讀為平聲余廉切。對「豔」的派生歷程有所認識之後，我們便能有把握地把 siã2 的語源認定為余廉切的「豔」。

換個角度來說，閩東寧德咸村方言的「引誘」義動詞讀為 ɕiɛm5，就漢語文獻來看，其語源無疑地可以認定為以贍切的「豔」。把閩東咸村「豔」ɕiɛm5（< *siɑm5）和閩南臺灣「豔」siã2（< *siɑm2）、閩東虎浿 θiem2（< *siɑm2）、閩北將樂 siaŋ9（< *siɑm2）放在一起，可以推測原始閩語階段就存在「豔」的平、去兩讀。在形態變化上，「豔」的兩讀其性質並不相同：去聲讀法是「不以音別義」，平聲讀法是「以音別義」。以原始閩語「豔」這個詞彙而言，結合漢語文獻的表現，它的時間深度至少可以追溯到東漢。

綜觀本文所考證的三個閩南語本字，在方法論上有幾點可以申說：第一、考證閩南語鼻化韻口語詞的本字不能只滿足於閩南語內部的音韻規則對應，應當妥善地利用同屬閩語的相關資料，最值得重視的是現代閩東語（如寧德）的表現以及原始閩東語的擬測。第二、考證本字必須具備音韻層次的觀念，在運用中古音系及等韻韻攝框架的同時，也須留意閩語本身因為時間層次不同而造成的例外。第三、前賢已經指出，既有的本字研究方法包括覓字、尋音、探義，最近則有學者（楊秀芳 2017）從方言形態變化的角度進行觀察，相當具有前瞻性。本文關於「豔」的探討就是受到這一方法啟發。本字考證是科學而嚴謹的學術工作，透過諸多方法的交互檢驗，可以讓我們更趨近歷史的真實。

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本文初稿送交審查後，得到三位不具名審查人中肯而有建設性的批評與建議，乃得以減少疏漏並有更周延的思考，謹此致謝。本文撰寫之際，在臺灣大學旁聽楊秀芳教授開設的「漢語形態學」課程，啟發本文中關於形態變化的相關討論，特此說明亦申謝忱。文稿排校過程中又獲得李天群及王品程兩位同學的意見回饋，一併致謝。當然，文中任何殘存的錯誤，責任均在作者。

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On three etymologies with *-m ending in Taiwanese Southern Min

This article discusses the etymologies of three commonly used colloquial words in Taiwanese Southern Min, namely: (1) the verb kã^{2}, which expresses 'to carry, contain, bring up'; (2) the adjective tĩ^{6}, which expresses the meaning of 'full and rising tide', and (3) the verb siã^{2}, which expresses 'to lure, attract something'. The finals of these three words in Taiwanese Southern Min are nasalized vowels without any kinds of nasal consonant. It is not easy to judge the origin of the early final endings of their etymologies, and it is also not easy to determine the correct written forms. Based on published Eastern Min materials and the reconstruction of Proto Eastern Min recently, this article confirms these three spoken words are cognates shared by Southern Min and Eastern Min and reveals that those three spoken words all had *-m endings in the early stage. From the perspective of Chinese historical phonology, those three cognates all belong to the Xián Shè rhyme group. The etymologies and the Proto Min forms of these three words are respectively: kã^{2} is 銜*kaim^{2}, tĩ^{6} is 潭*tiam^{4}, and siã^{2} is 豔*siɑm^{2}.

Keywords: Taiwanese Southern & Eastern Min, Proto Min etymology, comparative method

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中古漢語的副詞「都」

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中古漢語時期是「都」發展為副詞的初期，它的用法和現代漢語的「都」很不一樣。本文的要點如下：（1）描述中古漢語「都」的各種用法；（2）提出若干證據來證明中古漢語時期約束主語的「都」只有集合性解讀，當時分配性解讀應當尚未發展出來；（3）說明中古漢語「都」的用法是怎麼發展出來的。

關鍵詞：副詞「都」、中古漢語、分配解、集合解、程度副詞

1. 前言

本文主要是要探討中古漢語（東漢六朝時期）副詞「都」的語法性質與功能。在現代漢語中，副詞「都」的語法性質與功能已經累積了相當多的研究，但對於歷史中的副詞「都」，這種議題的探討卻是相當不足的。

研究中古漢語的副詞「都」，免不了要與現代漢語的副詞「都」相比較，比較之下自然就會引出不少問題，其中有的是在現代漢語的研究中也是還有爭議的問題，有的是現代漢語不會遇到的問題；後者主要是因為中古漢語的副詞「都」的用法與現代漢語的副詞「都」有相當的出入的緣故。

根據呂叔湘（1980: 153–154），現代漢語的「都」有三種用法：（1）「都 1」，表示「總括全部」；（2）「都 2」，表示「甚至」；（3）「都 3」，表示「已經」。[1] 其中的「都 1」還分出幾種用法；除了代表性用法，如例（1），另外還列了 4 種用法。這 4 種用法要不是中古漢語尚未產生，就是和本文的討論無關，因此以下言及「都 1」時，就限指例（1）這種用法。「甚至」和「已經」義的「都」在中古漢語尚未產生，可以不論。不過在「都 2」

[1] 「都 3」之例的「已經」義並非來自「都」本身而是由句子的其他部分以及語境推出的，這是現今一般的看法。「都 2」和「都 3」一般視為語氣副詞，有些學者認為「都 2」和「都 3」應該歸併為一，例如「都 2」和「都 3」在蔣靜忠、潘海華（2013）中就成為「都 2a」與「都 2b」之別。

的各種用法中列在最前的兩個例子，如例（2），我們認為，其中的「都」也可以解為表示「完全」，而且在有些情況下比解為「甚至」更為自然。[2]「都」的「完全」解與本文的論說不無關連，此點下文會有所說明。

（1） 大伙兒都同意。／把這些事都辦完了。／每個孩子都長得很結實。

（2） 我都不知道你會來。／我都忘了你的名字了。

「都 1」傳統上稱作總括副詞，有不少現代漢語學者認為「都 1」是「全稱量化詞」（universal quantifier），[3] 這個觀點是頗有爭議的，筆者認為置諸中古漢語同樣的疑問仍然存在，不過這個問題並不在本文的探討範圍中，在以下的討論中我們仍把「都 1」這種用法稱作總括副詞。也有學者指出現代漢語的「都 1」基本上是都是作「分配性解讀」（distributive reading）的，[4] 這點雖然不是沒有疑義的，但至少是適用於大多數的情況的；但是中古漢語之例看來並不能如此解讀，這是本文要討論的一個主要議題。

總之，中古漢語時期是副詞「都」發展的初期，它的用法和現代漢語的「都」很不一樣，當時不僅「都 2」和「都 3」這種用法應該都還未產生，連總括用法也是和現代漢語的「都 1」頗有出入的。

2. 中古漢語的副詞「都」的用法

2.1 中古漢語「都」的主要用法

中古漢語的副詞「都」大體可分為以下三種，雖然就實例上是有難以判別的時候：[5]

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[2] 如例（2）中的這種例句的主語不用作焦點的情況是很常見的，也就是這兩個例句中的「我」或謂語是可以不用作焦點的，這時的「都」就不能說含有「甚至」義，而用「完全」來解釋應是比較貼切的。

[3] 例如：Lee（1986）、Liu（1990）、Lin（1998）。

[4] 例如：Lee（1986）除了提出「都」為全稱量詞的觀點，同時也指出「都」可以賦予句子分配性。Lin（1998）對於「都」的分配性作了比較詳細的證明。

[5] 這幾類的主要用法在過去的論著中大都已指出來了，但因不注重界定，彼此在實例的歸類上常互有出入，尤其是總括副詞與程度副詞之間。本文對「都」的分類與前人的研究實質上差異不大，主要的不同是本文比較注重界定的釐清。

1. 「都 m」：保有動詞「聚合」義，介於動詞與方式副詞之間。
2. 「都 d」：程度副詞，最常見的是搭配否定詞。
3. 「都 q」：總括副詞，性質有別於現代漢語「都 1」，說見下。

「都 m」可以再分成幾種用法，以下分別稱作「都 m1」、「都 m2」、「都 m3」。

「都 m1」如例（3–5），表示聚合各方的人或事物來進行某種行動。這種「都」仍具「聚合」義，可以分析為方式副詞，也可以分析為動詞用為狀語。[6] 這幾例的「都」用如「合」或「總」。

（3） 置平準於京師，都受天下委輸。(《史記・平準書》)

（4） 方進知之，候伺常大都授時，遣門下諸生至常所問大義疑難，因記其說。(《漢書・翟方進傳》)

（5） 鎮北雖少事，而都典一方。(《三國志・魏書・夏侯玄傳》注引《魏略》)

西漢到六朝有一些官名來自這種「都」；例如西漢就有的「都護」（如例 6），中古漢語時期的「都督」、「都統」、「都將」、「都牧」、「都錄」、「都講」、「都水令史」、「都水使者」、「都事」、「都軍」等，其中多數是軍事的官職。「都護」義為統合各部來監護。「都督」意義相當後來的「總督」。「總督」之語大概始於東晉，但作為官名的時代則大概要晚至元明；以例（7）為例，「都督」已為官名，「總督」則仍是未成詞的狀述結構。可以看到，「都 m1」大抵都指向賓語，大概是源自動詞「都」的及物用法。「都 m1」這用法後來大抵為「總」所取代。「都」的「總」義應是由其聚合義發展而來的。

（6） 乃因使吉并護北道，故號曰都護。都護之起，自吉置矣。(《漢書・西域傳》)

（7） 癸丑，以新除中衛大將軍、揚州刺史始興王叔陵為大都督，總督水步紅軍。(《陳書・宣帝紀》)

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6 例（3）「都受天下委輸」的「都」，武振玉（2001）認為是動詞。

「都 m2」如例（8–11），「都」與後面的動詞合起來表示使事物合為一體。「都 m2」搭配的動詞不多，主要為「合」、「為」、「集」等。「都 m2」一般可以分析為連動式的第一個動詞，[7] 但似乎也可以分析為副詞。

（8） 天數之始也，是故天地未分之時，積氣都合為一；分為二，成夫婦。（《太平經・經文部數所應訣》）

（9） 夫一者，乃數之始起。故天地未分之時，積氣都為一；分為二，成夫婦。（《太平經・太平經鈔壬部》）

（10） 頃撰其遺文，都為一集。觀其姓名，已為鬼錄，追思昔游，猶在心目，而此諸子化為糞壤，可復道哉！（《三國志・魏書・王衛二劉傳傳》注引《魏略》）

（11） 微塵集為瓶時，若都集為瓶，一切微塵盡應為瓶；若不都集為瓶，一切非瓶。（（後秦）鳩摩羅什譯《百論》175b）

例（8）和例（11）的「都合」和「都集」看起來近於複合詞，但我們也可以把「都」分析為「合」和「集」的一種方式，如例（11）的「都集」和前面一句的「集」相對，意義看來有別。例（8）和例（9）應是同源的異文，因此「都合為」的「都合」和「都為」的「都」意義應當相當，從這個角度看來「都合」又可以分析為複合詞了。例（12）「都」和「合」之間有副詞「自然」隔開，所以會使人傾向把「都」分析為副詞，但「華都自然合為一華」也不能排除可以釋為「華聚合後自然合為一華」。

（12） 諸菩薩心意俱大歡喜踊躍，皆在虛空中共持華則散諸佛及諸菩薩、阿羅漢上，華都自然合為一華，華正團圓，周匝各適等。（（東漢）支婁迦讖譯《佛說無量清淨平等覺經》287a）

[7] 例（10）的「都為一集」的「都」，王敏（2018）認為是「匯集、聚集」義的動詞。

「都 m3」如例（13–17），義如「總（合）」，與後面動詞合起來義如「總計」，「都 m3」主要搭配的動詞如「合」、「為」、「有」、「成」。「都 m3」也是分析為動詞或副詞都是可以接受的。

（13） 比如餘木，雖微脆，亦足堪事。一畝二千一百六十根，三十畝六萬四千八百根。根直八錢，合收錢五十一萬八千四百文。百樹得柴一載，合柴六百四十八載。載直錢一百文，柴合收錢六萬四千八百文。都合收錢五十八萬三千二百文。（《齊民要術》卷五）

（14） 是時央伽摩竭國，有十千比丘，從迦維羅衛國來迎佛者有十千比丘，都合二萬比丘，皆得阿羅漢。（（蕭齊）僧伽跋陀羅譯《善見律毘婆沙》790c）

（15） 從此南行八由延到拘薩羅國舍衛城。城內人民希曠，都有二百餘家。（（東晉）法顯《高僧法顯傳》860b）

（16） 夏作，小者不迮，用小板挾之：一處與板兩重，都有四板。（《齊民要術》卷九引《食次》）

（17） 合集計校都得九十六億兩金。……「我今本望滿百億金施，今方得施九十六億，四億不滿，用為懊惱。……」（（西晉）安法欽譯《阿育王傳》110b）

（18） 至年十九。太子都合諸妓凡千五百人，共處一殿。（（吳）康僧會譯《六度集經》41c）

（19） 每貼分作三小貼，每小貼以水一升，煮取七合，溫服，再合滓為一服．重煮，都成四服。（《金匱要略．雜療方．四時加減柴胡飲子》）

例（13）中的「合收」和「都合收」的對比特別值得注意，「合收錢」和「都合收錢」的用法有所區別，「合收錢五十一萬八千四百文」和「合收錢六萬四千八百文」表示的都是物品單價乘以數量的乘積，而「都合收錢五十八萬三千二百文」則是表示這兩筆錢相加的總和。「都合收錢……」意義就相當「總合起來收錢得……」，可以說「都合」的「都」

有「總聚」的意含，也可以由此看出「都」和「合」不像是單純的並列關係。例（14）的「都合二萬比丘」相當「總合有兩萬比丘」,「都合」之後可視為隱含了一個 「有」、「得」或「凡」之類的詞。這種例子可以與例（18）的「都合諸妓凡千五百人」相比較，該例在「都合諸妓」後又跟著總計詞「凡」,意思相當「總合諸妓總共千五百人」。例（15）中的「都有二百餘家」相當「總合有兩百多家」；例（16）「都有四板」相當「總合有四塊板」；例（17）「都得九十六億兩金」相當「總合得到九十六億兩金」；例（19）「都成四服」相當「總合成四服」。

「都 m2」和「都 m3」都還是有「聚合」義，差別主要是前者著重在事物聚合為一體的狀況，後者則用來表示事物聚合後得到的累計量。「都」有的用法義近「總的、總體上」,[8] 這種意義的「都」介於「都 m」與下述的「都 d」之間，我們暫時歸入「都 m」。

「都 d」如例（20–23），意義相當「完全」。

（20） 曉遣參問，都無此事。(《世說新語・紕漏》)

（21） 衛玠始度江，見王大將軍。因夜坐，大將軍命謝幼輿。玠見謝，甚說之，都不復顧王，遂達旦微言。(《世說新語・文學》)

（22） 王江州夫人語謝遏曰：「汝何以都不復進，為是塵務經心，天分有限？」(《世說新語・賢媛》)

（23） 大將軍嘗先出，右軍猶未起。須臾，錢鳳入，屏人論事，都忘右軍在帳中，便言逆節之謀。(《世說新語・假譎》)

中古漢語的副詞「都」有一個被稱為語氣副詞或程度副詞的用法，經常搭配否定詞，意義和用法近於現代漢語的「完全」,這種「都」很難說是用來總括主語或賓語的。這種例子有的學者認為是表示程度，有的認為是表示強調語氣，但有的學者認為它還是屬於量化詞的。[9] 只是中古漢語的副詞「都」有些例子看不出有複數名詞可以約束，因此就難

8 「都」有的用法義近「總的、總體上」，如下文所引之例（31）的「都與鳥獸同一類」、例（67）的「形色都是甘」。

9 至今學者對於中古漢語「都 d」的研究大多集中在「都＋否定詞」的這種句子上，研究者對這種「都」之例的定位大體上可分為程度副詞、語氣副詞、範圍副詞三種。把「都 d」之例看作是程度副詞的例如楊伯

以說其中的「都」是全稱量化的。如例（20–23）的「都無此事」、「都不復顧王」、「都不復進」、「都忘右軍在帳中」等句中都沒有複數名詞，這種情況就很難說「都」是具有全稱量化的功能；不過要是我們把這些例子的「都」分析為「完全」義的副詞，那就沒有滯礙難通之處，而一般也是傾向於把這幾句分別解釋為「完全沒有這回事」、「完全不再看王敦一眼」、「完全不再有所進步」、「完全忘記王右軍還在帳中這件事」。這種用法的「都」，也就是本文的「都 d」。如上述，過去對於「都 d」到底要歸入語氣副詞還是程度副詞無法取得共識。如果所謂的語氣只是一種寬泛的用法，可以包括強調，那麼說「都 d」是語氣副詞並無不可；但如果把語氣副詞看作是（modal adverb），那麼「都 d」可能不太符合其界定。「都 d」的語義和用法，其實很接近英文的（totally），應算是一種「非梯級程度副詞」（non-grading adverb of degree），因此我們傾向於把它歸到程度副詞。雖然如此，我們認為對於「都 d」的命名並不是那麼重要的一個問題，應該注意的重點應是它究竟是具有怎樣的功能，這種功能是如何形成的。以下引述有關「都 d」的相關文獻時，採用哪個術語也是視情況而定。

中古漢語的副詞「都」有很大一部分的例子是搭配否定詞組的。[10] 不同的文獻使用比例不同，比如《世說新語》的 37 例中就有 30 例是搭配否定詞組的，但《太平經》中的 40 多例就沒有這種用例。如果就較多文獻的平均情況看，這種用例的比例也還是很高的。根據「中央研究院中古漢語標記語料庫」，若不計「都悉 4」、「都皆 3」、「都共 7」、「都咸 1」、「大都 8」這種複合之例，副詞「都」還有 388 例，[11] 其中「都無」103 例，「都不」86 例，「都未」2 例，總共就 191 例，佔了副詞「都」之例近半。雖然這只是語

峻、何樂士（1992）；楊榮祥（1998）；武振玉（2001）；喬石豪（2007）等。把「都 d」之例看作是語氣副詞或強調副詞的例如太田辰夫（1958）；張誼生（2004）；康振棟（2009）等，主要的說法是這種「都」是用來加強否定的。把「都 d」之例看作是範圍副詞或總括副詞的例如柳士鎮（1992）；高育花、祖生利（1999）等；不過他們在歸類上雖然是如此，在描寫上卻又另有玄機。柳士鎮（1992）認為，這種「都」是「表示動作發展全面周到，無一遺漏」；高育花、祖生利（1999）則一方面認為這種「都」是表達程度的百分之百，另一方面也還把是這種「都」看作範圍副詞。總之，他們雖然把這種「都」歸入總括副詞或範圍副詞，但在說明上與主張「都」是程度副詞或語氣副詞者的卻又很難說有明顯的不同。大體而言，對於「都 d」所賦予的這些不同名稱只是切入點不同，其實都指的是那種主要是作用於謂語而缺少可供量化的名詞的「都」。

10 中古漢語副詞「都」後接否定謂語的大多為程度副詞用法，學者多有指陳，例如楊榮祥（1998）、武振玉（2001）等。

11 此外還有「都盧」23 例，只見於東漢與晉的佛教譯經中。「都盧」與「都」應同出一源，有動詞和副詞（狀語）用法，但副詞用法疑仍保有相當的動詞性。「都盧」作動詞時也是「聚合」義，副詞用法也有與「都 d」相類的（例見下）。由於「都」之例已足夠用來證成本文的主要論點，我們暫且不論「都盧」。

（i）善男子善女人書般若波羅蜜，於四部弟子中說時，其心都盧無所難。（（東漢）支婁迦讖譯《道行般若經》434c）

料規模不是很大的一個語料庫的現象，其他的中古漢語語料庫「都」搭配否定詞組的例子比例未必這麼高，但我們至今所見有「都」例的中古漢語文獻，沒有這種例子的典籍只佔一小部分，可見這種例子在當時是相當常見的。中古漢語這種搭配否定詞的「都」例，其中絕大多數的「都」是較適合分析為「都 d」的。總合中古漢語「都」的肯定句和否定句之例，可以說「都 d」佔了副詞「都」的用例之多數。

有人把例（24）這種例子的「都」視為是「甚至」義的用法，如李強（2004: 416）認為相當「連…都」，喬石豪（2007: 110）認為是指向強調的焦點「弟子」。我們認為「都 2」在中古漢語仍未產生，例（24）的「都」應該仍然是「都 d」，其義相當「完全」，而「甚至」義的解讀應該不是合乎那個時代的正解。

（24） 弟子都未解，阿彌那得已解？（《世說新語・文學》）

「都 d」的這種用法現代漢語也不是沒有，主要也是搭配否定詞，但研究上好像較少受到關注。像例（2）的這種例句呂叔湘是歸入「甚至」義的，但我們認為這種例句的「都」有時用「完全」義解釋比用「甚至」義解釋要來得合適。

「都 q」也就是總括副詞，如例（25–30）。

（25） 先遣一使白大王言：「臣等所領三萬六千諸小王輩，為當都去，將半來耶？」時此化王報使者言：「將半速來。」（（吳）支謙譯《撰集百緣經》248a）

（26） 佛言：「若有如是怖畏處，若少乞與少，若乞半與半，若都索都與，莫以是因緣故得大衰惱。」（（後秦）弗若多羅共羅什譯《十誦律》250a）

（27） 夏月欲末，莫令我於福德空過。若不能都請者，當於僧中請少多比丘。（（後秦）弗若多羅共羅什譯《十誦律》86a）

（28） 彼使人作如是念：「居士大富多有財寶故，為比丘故送此飲食。我今寧可都以此飲食與諸比丘。」（（姚秦）佛佗耶舍共竺佛念譯《四分律》873a）

（29） 幼起同辟有薛孟嘗者，與弟子共居，弟子常求分，力不能止，固乃聽之，都與。（《風俗通義・過譽》）

（30） 書而記之，聚於一間處，眾賢共視古今文章，竟，都錄出之，以類聚之，各從其家。(《太平經・件古文名書訣第五十五》)

例（25）的「為當都去，將半來耶？」義為「是全部都去，還是只要帶一半的人去？」，「都」與「半」對應，可以推知「都」意指全數，這樣的例子不能說「都」沒有總括的功能。例（26）的「若少乞與少，若乞半與半，若都索都與」義為「若是索求少的就給少，若是索求一半的就給一半，若是索求全部的就全都給」，例（27）的「若不能都請者，當於僧中請少多比丘」義為「若是不能全數的僧侶都請來，就應該在僧侶中找一些和尚來請」。這三例都一樣在上下文中有表部分的詞與「都」相對立。例（28）的「都以此飲食與諸比丘」義為「把這些飲食都給那些比丘」，例（29）的「都與」義為「全都給」，例（30）的「都錄出之」義為「把這些文章全都抄錄出來」，這幾例句中「都」也都有約束的名詞。或許在以上的例子中會有人認為不是所有的「都」都失去聚合義的，如例（30），但如例（25–29）的這種例子的「都」應可確定已失去聚合義，因此中古漢語的「都」應可確定已有分析為總括副詞的。

中古漢語的「都 m」、「都 d」這兩種用法是上古漢語的總括副詞所沒有的，「都 q」的用法也與上古漢語的總括副詞有所區別（說見下文）。因此「都」是一種具有新功能的副詞，它的興起與流行對於上古漢語的總括副詞系統是有功能增補作用的，並非只是副詞的新舊替換而已。

2.2 中古漢語「都」的程度副詞與總括副詞的分際問題

中古漢語的「都」例是屬於「都 d」還是「都 q」有些用例是沒有判定的困難的，但是也有不少用例究竟何屬是見仁見智的。在副詞「都」剛開始發展的中古漢語早期有這種爭議的例子佔比尤其高，連帶的就產生究竟是「都 d」先產生還是「都 q」先產生的問題。有的研究者認為「都 q」東漢就已產生；有的研究者則持相反的看法，認為中古漢語早期只有「都 d」的用法，「都 q」是在中古漢語較後期才發展出來的。如例（31）「都與鳥獸同一類」與例（32）「不能都曉古今」中的「都」原本一般認為是最早的總括副詞之

例，楊榮祥（1998）卻認為應分析為程度副詞。根據其所考察的例子，該文的結論是中古漢語的「都」是先發展為程度副詞，由此再發展為總括副詞。相對的，谷峰（2015）檢視東漢時期的「都」例，認為東漢文獻的「都」包括這兩例全都應分析為全稱量化詞，當時並無語氣副詞的用例，其結論自然是「都」是先發展為總括副詞的。

（31） 然則鳳皇騏驎，都與鳥獸同一類，體色詭耳，安得異種？（《論衡・講瑞》）

（32） 儒生不能都曉古今，欲各別說其經。(《論衡・謝短》)

在我們看來，中古漢語「都 d」與「都 q」間的歸類並不是簡單的一刀切的問題，以下就來討論這個問題。

中古漢語一個句子中的「都」是否可以歸入「都 q」，目前主要的憑準就是有個複數名詞可以作為「都」所約束的論元；[12] 但在中古漢語有這種條件的句子中的「都」是否就是「都 q」還是不能驟下論斷的，因為僅是「都」對那個複數名詞是否有所約束就往往無法得到共識。至於要判斷中古漢語一個句子中的「都」是否宜歸入「都 d」，我們認為相對上有較為明確的標準可以依據，如：(1) 句中沒有「都」可以約束的複數名詞，比如不及物動詞句的主語是單數的或者及物動詞句中的名詞都是單數的，如上舉例 (20–23)；(2)「都」即使省略也不影響命題義。[13] 中古漢語的「都＋否定詞」的句子大多是這種情形，例如當時「都無」之例的「都」省略掉一般也不會影響命題義，「都不」之例的「都」省略掉會影響命題義的也是不多的。如例（33）中的「都無一比丘與世尊等等」與「無一比丘與世尊等等」同義，例（34）中的「都不見人」與「不見人」同義。

[12] 李素英（2013: 126–130）認為以下幾個標準可以用來判定「都」為總括副詞：1.「都」與其他總括副詞並用（此條是根據楊榮祥（2005）的）；2.「都」與其他總括副詞互文；3.「都」前有表示持續、慣常的時間副詞（指的應該是時間副詞為「都」所約束的情況）。只是這幾個標準的有效性頗令人懷疑。漢語中並用的副詞多的是功能不同的，與總括副詞並用的未必即是總括副詞。文獻中對舉的二詞也多的是功能有異的，至少也要二詞在性質、語境上都沒有差異才能說二者有可能為同類副詞。至於「都」約束表示持續、慣常的時間副詞的這種用法，我們認為中古漢語是否已有這種用法值得懷疑，該文所舉之例都很可疑，我們認為分析為「都 d」應更合適。谷峰（2015: 237–238）認為東漢與三國有幾個「都」是量化時間的例子，我們認為這些例子也還是應分析為「都 d」或者是約束主語的「都 q」。

[13] 這一條在現代漢語或許不盡適用。

（33） 尊者阿難答曰：「雨勢！都無一比丘與世尊等等。」摩竭陀大臣雨勢復問曰：「唯然，阿難！無一比丘與世尊等等。……」（（東晉）僧伽提婆譯《中阿含經》654a）

（34） 既入聚中，闚視諸舍，都不見人，執諸瓦器，悉空無物。既不見人，求物不得，即便坐地。（（北涼）曇無讖譯《大般涅槃經》742c）

只是這 2 條憑準在適用範圍上還是有限的，因此應用上也還是有所不足的。比如肯定句中如果有複數名詞可作為「都」的約束對象時，也還是很難決定那個「都」到底是屬於「都 q」還是屬於「都 d」的。由於有歸類困難的例子並不少，中古漢語總括副詞「都」究竟從什麼時候開始也就很容易成為爭議的焦點。我們得先看中古漢語「都」的使用狀況是怎樣的，才比較能了解為何「都」例的歸類常會出現有爭議的情況。

如上述，中古漢語的「都」出現在「都＋否定詞」的句子比例很高，這種例子大多數可歸入「都 d」，暫且不說。用在肯定句的「都」不僅佔比較低，使用上也是很受限制的。中古漢語肯定句的「都」搭配的動詞最常見的是消失義動詞和聚合義動詞。[14] 聚合義動詞常見及物用法，所用動詞主要是「合、會、集、合集、計、聚」等，這種例子的「都」大多可視為「都 m」，比較不會造成歸類的問題。肯定句的「都」句有很大的一部分是不及物動詞句或受事主語句，謂語一般具狀態性，使用的動詞以消失義動詞為多，例如「盡、殺盡、噉盡、食盡、消盡、壞盡、死盡、破散盡、滅、焚滅、滅定、亡、息（熄滅）、索（空）、斷、絕、乏絕、截、除、消除、棄捨、棄、捨、捐、失、敗失、歇、愈（疾病消去）、除愈、差（瘥）、寂、沒、廢、放、損減、隱」。由於主語多為複數名詞，因此前人多把這種句子的「都」分析為「都 q」，但其實這種「都」常兼有總括和程度的功能。這一類的部分句例，當我們把關注的重心放在主語上，就會覺得「都」是總括用法；把重心放在謂語，就會覺得「都」比較像是程度用法。如例（35）的「盜賊都息」，既可以理解為盜賊全都消滅，也可以理解為盜賊完全（徹底）消滅。又如例（36）的「財物都盡」，既可以理解為財物全都沒了，也可以理解為財物完全沒了。

[14] 中古漢語副詞「都」經常搭配消失義動詞，也早有學者指出，例如陳寶勤（1995: 66）就指出，「都」後的動詞一般為表示消滅、廢除義，如「滅」、「盡」、「除」、「廢」等。

（35） 如斯三年，四境寧靖，盜賊都息。((吳）康僧會譯《六度集經》3c）

（36） 為賊所劫，財物都盡。((東晉）佛陀跋陀羅譯《摩訶僧祇律》361a）

中古漢語的動詞賓語很少提前，一般仍位於動詞後。當時在及物動詞句中的「都」，無論是否後接否定詞，通常不是約束主語而是指向謂語的。[15] 在這種情況之下，如果動詞的賓語為單數，「都」就只能分析為「都 d」；如果賓語不是單數，那麼「都」到底是修飾整個謂語的還是約束賓語的，往往就成了仁智互見的局面，相應的也產生在判定「都」是「都 d」還是「都 q」上的分歧。如上舉例（32）「儒生不能都曉古今」的「都」可以理解為「完全的」或「統整的」之義，[16] 也可以理解為集合解的「全都」。[17] 只是在中古漢語的及物動詞句中，「都」是否容許兩解與謂語是否具狀態性密切相關。[18] 如果謂語是動作性的，原則上是不太能與「都 d」搭配的，因此這種例子的「都」大多可以推斷是「都 m」或者是約束賓語的「都 q」；如果謂語是狀態性的，就大多數的例子來說，把「都」分析為「都 d」會比分析為「都 q」要合適得多。[19]

中古漢語的「都」的歸類會常有爭議，最主要是因為當時有不少的「都」例在判斷為「都 d」與「都 q」時會有莫衷一是的情況發生，而孰是孰非往往也難以判定。中古漢語的「都」為何會有這種難以定位的情況呢？我們認為，這應該與「都」的詞義來源以及其在中古漢語的功能有密切的關連，簡單的說，就是由於「都 d」和「都 q」在意義上和發生學上是關係密切的。「都」的核心義本為「聚合」，中古漢語的副詞「都」的發展多少仍受到這個語義的制約。一方面副詞「都」很容易搭配狀態性謂語來表現這個聚合力量所造成的結果，相應的「都」也就很容易成為對謂語有強化作用的副詞；另一方面，

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15 如果動賓結構相當一個詞時，那就另當別論，例如「都＋離垢」的「都」就有可能是指向主語的。

16 谷峰（2015: 231）認為下列例（i）中的「總問儒生以古今之義」與例（32）的「都曉古今」文辭相近，既然其中的「總」表示全稱量化，那麼例（32）的「都」也應是表示量化。這個論證的問題如下：一，根據文義，「總問儒生以古今之義」問的應是古今之大義而不是全部之義，「總」具有「總其要」或「總的」之義；二，「總」是否全稱量化詞頗具爭議，即使在現代漢語，它也是限制整個謂語而不是約束某個名詞論元的

（i） 夫總問儒生以古今之義，儒生不能知，別名(各）以其經事問之，又不能曉。(《論衡・謝短》)

17 關於集合解與分配解之辨說見下文。現代漢語的「全都」似乎兼容集合解與分配解。

18 不只是狀態動詞句，受事主語句、「都」後帶否定詞的句子的謂語往往也會具有狀態性。在否定句中，謂語的動作性很容易削減而趨同於狀態性。

19 也有少數的例子是可以分析為「都 m」的。

「都」既源自事物之聚合，它又本非與量無涉。因此對於一個含有複數名詞的狀態動詞句來說，要說「都」是具強化作用還是具總括作用就很容易成為見仁見智的結果。這種情況以不及物狀態動詞句為最明顯。[20] 這種句子當我們著眼在主語，就會覺得「都」是總括副詞；著眼在謂語，就會覺得「都」比較像是程度副詞。至於「都」搭配及物動詞時，如上所述，主要也是聚焦在謂語部分，由於對「都」而言，動詞賓語的可及性既不如主語，當謂語具狀態性時，「都」就很容易被理解為是程度用法。

3. 中古漢語的總括副詞「都」為集合解

3.1 中古漢語的副詞「都」當為集合解的證明

一般認為現代漢語的總括副詞「都」是全量副詞，而且基本上是表分配的。雖然現代漢語的「都」是否所有的用法都應作分配解是不無疑義的，[21] 但大部分的情況可以接受是作分配解的。至於中古漢語的「都」，如第 2.1 節所示，「都」無疑已有總括用法之例，但是否也是當作分配解其實是一個有待探討的問題。在此我們且不論「都」分析為全量副詞是否適當的問題，只討論中古漢語「都」是否也是分配解的問題。考察歷史文獻，從南宋以後「都」的用法大抵都可說主要是分配解的，但是在中古漢語時期顯然並非如此，當時有相當多的用例顯示「都」是表「集合的」（collective）。以下將提出若干證據

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[20] 如果不特別區分，本文的狀態動詞是包括性質動詞（形容詞）的，中古漢語副詞「都」搭配性質動詞的例子罕見。

[21] Lin（1998: 202–203）在證明「都」為具分配性時指出，即使論元是單數的，也可以把它看作是由部分組成的複數，因此以下的例（i–ii）是合法的而且可以據此推出「都」是具分配性的。但是要這麼看的話，任何事物都有部分，要怎麼理解所謂的部分，要怎麼認定和切分，又會進一步產生新的問題。何況也不是所有同類型的例句都是合法的，如例（iii–iv）。再從語義上來看，例（i–ii）我們通常不會理解為「那本書的每個部分我一一看完了」、「那盆水的每個部分都一一流光了」，就算我們說這種例句時心裡存著那本書或那盆水是由部分組成的念頭，但我們也是以一個整體來看待所指的，這樣還是不如說這種例句的「都」是集合性的。因此我們很難同意這種把單數視為複數的見解對於「都」的分配解是有證明效力的。現代漢語的「都」還有一些用法很難說是具分配性的，但因與本文所論並非直接相關，這裡不加以討論。

（i） 那本書，我都看完了。

（ii） 那盆水都流光了。

（iii） *這個蘋果都爛了！（引自王麗香 2013: 39）

（iv） *這座塔都崩塌了。

來證明「都」的分配解在中古漢語時期應當尚未發展出來。

中古漢語的總括副詞「都」為集合性的而不是分配性的有以下的證據。

A. 當動詞賓語為數量詞組時

上古漢語的總括副詞到了中古漢語大都仍然很常用，尤其是「皆」，從上古漢語到中古漢語都是總括副詞中最常用的。比較「都」與「皆」的用法，頗有助於中古漢語「都」的功能的釐清。上古漢語的「皆」如果是約束主語時，大抵是表分配的，到了中古漢語，「皆」仍維持分配用法；相對的，中古漢語的「都」並沒有分配用法。例如，上古漢語、中古漢語的「皆有＋數量詞」就像現代漢語的「都有＋數量詞」一樣基本上都是表分配的，「有」後的數量一定是主語的每一個成員各自擁有的數量，如例（37–39）。

（37） 人皆有七竅以視聽食息，此獨无有，嘗試鑿之。(《莊子・應帝王》)

（38） 宋氏以來，一用晉制，雖大小國，皆有三軍。(《宋書・百官志下》)

（39） 一一浴池有千蓮華，一一蓮華皆有千葉，七寶所成，一一葉端皆有千數七寶眾蜂，一一葉間有千天子。((元魏）般若流支譯《正法念處經》155b)

相對的，中古漢語所有的「都有＋數量詞」之例大體為「總共有」之義，如例（40a）。[22] 其意義和功能近乎當時的「凡有」，如例（40b）。總之，中古漢語的「都有」之例是沒有分配解的，[23] 和上古漢語的「皆有」以及現代漢語的「都有」用法都不一樣。雖然中古漢語的「都有」之例的「都」是副詞還是動詞還有待確定，但總之絕無分配的用法。

（40） a. 爾時中國都有七百僧集。((東晉）佛陀跋陀羅譯《摩訶僧祇律》493b)

b. 爾時諸羅漢及持律比丘，凡有七百僧。((東晉）法顯《高僧法顯傳》862a)

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22 這種例子在本文是屬於「都 m3」之例。

23 事實上，從中古漢語到唐代，「都有＋數量詞」的用法大體都是跟例（40a）一樣，我們沒有見到這段時間有分配用法之例。

B. 與重疊詞的搭配

中古漢語的重疊名詞通常是逐指的，也就是表示分配的；上古漢語以來的「皆」由於也是分配性的，因此搭配重疊名詞不成問題；相對的，中古漢語的「都」從不搭配重疊名詞，由此也可以推斷為與分配性不相容。例如中古漢語的「一一」和「一切」都是意指全體的，但前者是分配性的而後者則否。考察中古漢語文獻，「都」雖然可以搭配「一切」，但從不搭配「一一」以及其他的重疊名詞；相對的，當時的「皆」是「一切」和「一一」都是可以搭配的。如例（41）搭配「一一」的是用「皆」，而「都」是用來搭配「一切」的。此例「一一皆嘗」是說拿果子一個一個的嚐過，而「一切都棄」表示的是把那些果子一股腦兒全都拋棄。除了「一一」，中古漢語表逐指的重疊詞搭配「皆」的例子也不少，如例（42–46）的「人人」、「處處」、「事事」、「家家」、「味味」，但從不搭配「都」。

（41） 尋即取果，一一皆嘗，持來歸家。長者見已，惡而不食，便一切都棄。((蕭齊）求那毗地譯《百喻經》554a）

（42） 人人皆與之摩尼珠價直一億兩金。((梁）寶唱《經律異相》225c）

（43） 處處皆有流泉浴池。((東漢）康孟詳共竺大力譯《修行本起經》469b）

（44） 長者聞其事事皆能，即雇使作。((元魏）吉迦夜共曇曜譯《雜寶藏經》469b）

（45） 天下家家皆有炊食。((吳）支謙譯《孛經抄》734a）

（46） 若干種味，味味皆知，足以支形，不以為樂。((吳）支謙譯《梵摩渝經》884a）

C. 與「各」的搭配

副詞「各」自古以來都是表分配的，因此中古漢語的重疊詞亦可搭配「各」。中古漢語「各」只搭配「皆」而不搭配「都」。中古漢語可以看到「皆各」、「皆各各」、「各皆」、「各各皆」等，如例（47–50），但當時的「都」是不與「各」同句共現的。

（47） 有七重渠水，水中皆各有四色蓮華，水底皆有金沙。((西晉）法立共法炬譯《大樓炭經》291a）

（48） 十方諸佛等皆各各伸右手著曇昧摩提菩薩頭上。((西晉）竺法護譯《菩薩十住行道品》454b）

（49） 如是四處各皆起塔供養舍利。((西晉）安法欽《阿育王傳》116b）

（50） 我等各各皆得道諦，慈愍一切，不害生類。((姚秦）竺佛念譯《出曜經》715c）

D. 與「相」的搭配

副詞「相」通常搭配動詞來表示主語指涉的集合之成員間相互做同樣的行為，其中有不少情況是表示彼此對抗的，這是與集合性相違的。依此可推，如果中古漢語的「都」具集合性，就不應與「相」同句共現，事實上中古漢語的「都」也是不搭配「相」的。[24] 相對的，具分配性的「皆」以及重疊詞都與「相」不相牴牾，因此都可以搭配「相」，如例（51–52）。

（51） 諸織師法，有事皆相佐助。((後秦）弗若多羅共羅什譯《十誦律》115b）

（52） 若干種寶以成宮殿，光光相照，明明相續。((姚秦）竺佛念譯《最勝問菩薩十住除垢斷垢經》1011a）

E. 「都」與謂詞的搭配

中古漢語「都」常搭配否定詞而構成「都不」、「都無」的形式，這種例子的「都」大多數應分析為程度副詞；至於肯定句，就有部分用例的「都」是可以分析為總括副詞的。肯定句的「都」搭配不及物動詞時，不及物動詞的用詞很有限，最常見的是消失類動詞，

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[24] 文獻上有一個「都相合會」之例（例如下），但我們可以把「相合會」整個視為集合性的一個短語。

（i）是亂風者，都為八方上下眾風中之自然，都相合會共化生耳。((東漢）支婁迦讖譯《無量清淨平等覺經》285b）

尤其以「盡」、「滅」之例為最多，消失類動詞以外的動詞很有限，用例也都較少。中古漢語的「盡」、「滅」、「息（熄滅）」這種消失類動詞常用來表示眾多事物一體性的消失，此時就具有集合性謂詞的性質。[25] 例如佛經中「都盡」、「都滅」、「都息」通常表示主語指涉的所有成員一體性的消失，如例（53–55）以及上文所舉的例（35–36）。[26]

（53） 分溫三服，初一服，其人身如痹，半日許復服之，三服都盡，其人如冒狀，勿怪。（《傷寒論・辨太陽病脈證并治》）

（54） 積年之久，山果都盡。（（吳）康僧會譯《六度集經》13c）

（55） 昔有一人事須火用及以冷水，即便宿火，以澡灌盛水置於火上，後欲取火而火都滅。（（蕭齊）求那毘地譯《百喻經》546c）

中古漢語其他搭配「都」的集合性謂詞較多見的還有「圍、周、遶、合、會、集、合聚、離、散、滿、塞」等，[27] 使用這些謂詞的例句一般不能換用「皆」。例如：

（56） 陽明中風，脈弦浮大，而短氣，腹都滿，卻下及心痛，久按之，氣不通，鼻乾，不得汗，嗜臥，一身及目悉黃，……（《傷寒論・辨陽明病脈證并治》）

（57） 大鐵圍山，根入大海，深下八萬二千由旬，高亦如是，常住不壞，都遶世間。（（蕭齊）僧伽跋陀羅譯《善見律毘婆沙》697a）

（58） 有諸罪人，獄卒剝皮，從足跟至頸則止，不令都離。又獄卒從頸項剝皮，至足跟而止，亦不都離。（（陳）真諦譯《立世阿毗曇論》208a）

（59） 若盜瓶中蛇，蛇尾未離瓶口者，未波羅夷；若頭尾都離滿者，波羅夷。（（東晉）佛陀跋陀羅《摩訶僧祇律》247b）

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25 中古漢語的這類謂詞也可以搭配分配性副詞「皆」，但這種例子多表示複數的集團各自發生謂詞所指涉的事件。

26 不過如上述，搭配消失義動詞的「都」不能排除分析為「都 d」的可能。

27 如 2.1 節所述，與「合、會、集」搭配的「都」，我們大抵會分析為「都 m3」。

以上這些例子大都可以兼解為「都 d」與「都 q」；如果都是以「都 q」來分析的話，「都」就只應是集合解而不會是分配解。例（56）的「腹都滿」只宜理解為肚子整個都脹滿而很難說是每個部分都滿了；例（57）的「都遶世間」只宜理解為整座山圍遶世間而很難想像是山的每個部分圍遶世間的；例（58）的「都離」只宜理解為整個人皮與身體全都分離而不宜理解為人皮的各部分各自與身體分離；例（59）的「都離滿」只宜理解為蛇從頭到尾整條都離開瓶口，蛇頭或蛇尾是談不上各自離滿的。現代漢語的「都」也能搭配集合性謂詞，那麼是否可據此主張現代漢語的「都」並不具分配性呢？如果這點不足以否定現代漢語的「都」具分配性，那麼此點是否也不足以否定中古漢語的「都」具分配性呢？不過現代漢語的「都」搭配集合性謂詞畢竟是頗有局限的，因此就大多數的情況來說還是很難說現代漢語的「都」是不具分配性的；中古漢語的「都」的情況很不一樣，與它搭配的不及物動詞反倒是以集合性謂詞為主流。

中古漢語的「都」較常搭配的另一類動詞是終訖義動詞，如「畢、竟、訖、了、訖了」等，如例（60–62）。這種例子也大抵是可以兼解為「都 d」與「都 q」的；如果都是以「都 q」來分析的話，「都」也是只應是集合解而不會是分配解的。這種例子都是表示事件整個結束，不宜理解為事件各部分逐一結束。

（60） 又大會時，露地敷僧臥具，諸比丘一坐一起，輒皆舉之，由是速壞，以是白佛。佛言：「若不雨，聽事<u>都畢</u>，然後舉之。」（（東晉）竺道生譯《五分律》43a）

（61） 諸比丘著僧衣，小污便浣，由是速壞。以是白佛，佛言：「不應數數浣。作<u>都竟</u>，然後浣舉。」（（東晉）竺道生譯《五分律》137b）

（62） 佛陀什謹執梵文，于填沙門智勝為譯，至明年十二月<u>都訖</u>。（（東晉）竺道生譯《五分律》194b）

與「都」搭配的不及物動詞中，集合性謂詞以及表終訖義的動詞佔了絕大多數。如果「都」具分配性，所搭配的動詞不應以這樣的動詞為主；以這樣的動詞分布表現為據，中古漢語的「都」不具分配性也是很明顯的。即使「都＋V」不是採用集合性謂詞的，也是有應看作是集合體之變動的事件的，如例（63）的「都」如果分析為「都 q」，也應該是集合解，「北方」應該是以一體看待的而不能看作是多個離散的地區，因此在中古漢語語料中我們可以見到幾個「～方都定」之例，卻未見「～方皆定」之例。

（63） 北方都定之後，操率三十萬眾來向荊州。(《三國志·吳志》引諸葛恪〈出軍論〉)

中古漢語的「都」為集合解，我們也可以說其所約束的論元無所謂單複數，因為其所指涉之物是被一體看待的；或許就是因為如此，「都」才可以出現在沒有複數名詞的句子中。

過去對中古漢語時期副詞「都」的性質，所討論的主要是集中在「都」是總括副詞還是程度副詞之辨，並未注意到這個時期副詞「都」是集合性還是分配性的問題，因此就中古漢語這個議題而言，過去實際上是缺乏討論的。即便是黃瓚輝（2021）一文是主張「都」是由集合性演變為分配性的，但該文主要也只是借由「都」原本具有「聚合」義而現代漢語的「都」具有分配性這樣的對比而推敲得來的，並不是根據歷史語料的語法證據來論證的，該文內容也未論述「都」的集合性與分配性的發生時期以及具體的演變過程。本文對於中古漢語的「都」主要是集合性的這個觀點的構思實際上是考察中古漢語「都」的語料而得出的，有別於黃瓚輝（2021）是根據古今「都」之語義對比而推得「都」應是由集合性演變為分配性的。[28]

3.2 關於總括副詞並列的問題

以上的證據可以證明中古漢語的「都 q」當作集合解，但也有一種看來像是反例的現象需要解釋。

東漢到西晉的佛教譯經中出現了幾個「都皆」、「都盧皆」之例，如例（64–65）。上文指出，「皆」具有分配性，如果它能與「都」、「都盧」並列，那麼似乎可作為本文主張「都」應為集合解的反證。[29] 但我們認為這種證據尚不足以為反證，主要是因為「都皆」之例只見於西晉以前的佛教譯經中，「都盧皆」之例只出現在東漢支婁迦讖譯的《道行般若經》中。早期的佛經譯者一方面對於中譯還不怎麼嫻熟，對於漢語語法的理解也難免會有誤區；另一方面魏晉譯者為了堅持四字格律與駢儷之美，經常添字來湊足音節，因而產出了不少與當時語法實際有違的用例。我們認為，「都皆」、「都盧皆」就是這種情況下的產物，是為修辭的目的特地創造出來的。

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[28] 黃瓚輝（2021）推判「都」如何由集合性演變為分配性，並不是在歷史語料中尋求證據，而只是單純從語義上來尋求解釋，該文認為會有這種演變是因為在邏輯語義上集合與分配之間是對立統一的，只是能有這種對立統一似只限於「都」、「總」這種具有聚集義的詞。關於「都」如何由集合性演變為分配性，筆者有自己的看法，只不過「都」具有分配性是晚至宋代才發展出來的，並不屬於本文的研究範圍，我們將另文討論。

[29] 中古漢語還有「都悉」之例，但因為上古漢語的「悉」本具集合性，因此這種例子不能作為反證之例。

（64） 閻浮利人都盧皆行阿耨多羅三耶三菩，阿耨多羅三耶三菩者，皆發意求佛，若善男子、善女人持般若波羅蜜經卷，與他人使書，為解說其中慧、教令學，及至阿惟越致菩薩摩訶薩，持般若波羅蜜經卷，授與使入點慧中，其福轉倍多。((東漢）支婁迦讖譯《道行般若經》437c）

（65） 八方上下無央數佛國諸天、人民、及蜎飛蠕動之類，諸生無量清淨佛國者，都皆於是七寶水池蓮華中化生，便則自然長大，亦無乳養之者，皆食自然之飲食。((東漢）支婁迦讖譯《無量清淨平等覺經》284a）

3.3 幾個疑例之分析

上文指出，中古漢語的總括副詞和程度副詞之間在實際上本有難以區別之處，因此對於某些有仁智互見的例子，我們本可不需強求非得分判個孰是孰非不可；不過有的例子的判別與本文的主張相關，不能不有所說明。

高育花（2007: 123）認為如上舉的例（31）的「都與鳥獸同一類」與例（66）的「二王都不得餐」、例（67）的「形色都是甘」這種例句的「都」是著眼於對象的每個個體，相當“everyone”。換句話說，該文認為這種例子的「都」是表分配的。

（66） 謝與王敘寒溫數語畢，還與羊談賞，王方悟其奇，乃合共語。須臾食下，二王都不得餐，唯屬羊不暇。(《世說新語・雅量》)

（67） 又有「壺橘」，形色都是甘，但皮厚氣臭，味亦不劣。(《齊民要術》卷十）

該文會這樣看，應是受到現代漢語語感的影響所致。如果例（31）的「都」是表分配的，那麼此例不就應解為「鳳皇是與鳥獸同一類，騏驎也是與鳥獸同一類」嗎？然而事實上只有鳳皇是鳥，只有騏驎是獸。[30] 因此我們認為此例的「鳳皇騏驎」應是一體看待不作分別的，例句中的「都」看作是「都 d」或者是集合性的總括副詞都可以，可以解為「鳳皇騏驎完全（總歸）是與鳥獸同一類的」，也可以解為「鳳皇騏驎全都是與鳥獸同一類

[30] 楊榮祥（1998: 312）把例（31）的「都」分析為程度副詞，其理據疑為與我們這裡說的相類，只是解釋說得不是很明白而已。

的」。例（66）的「都」也有不少論著是視為總括副詞的，大概也都傾向於是表分配的。但此例若是解為「兩人完全無暇吃飯」，把「都」分析為「都 d」，在文義上並沒有不合適之處。[31] 此例的「都」就算視為總括副詞，也還是能分析為表集合的，相當「全」或「全都」。不過以中古漢語只能有總括副詞一解的「都」例仍然相當稀少來看，我們比較傾向於把例（31）和（66）這種例子的「都」分析為「都 d」。如果我們拿例（31）的「NP1 都與 NP2 同一類」與例（68）的「NP1 與 NP2 都無差別」這兩種表義相類的構式來比較，就會覺得例（31）的「都」分析為「都 d」是比較合適的。例（68）的「都無差別」的「都」如果是分配解的總括副詞的話，那麼主語的成員最少應是三個以上，但此例的主語只有「我」與「帝釋」兩個，因此「都」不能作分配解；然而「都」也很難作集合解，因此此例的「都」分析為「都 d」是最合適的。例（67）「形色都是甘」高文應該是解為「形與色都是甜的」，我們認為此句釋為「形色總體上看是甜的」更為合理，壺橘若是單看形或色應該很難判斷是不是甜的。形與色固然可以分看，但也是不可分的一體兩面，「形色」在中古漢語就是常見的複合語，用來指一物的整個形貌，如例（69）應該就是說甘蔗的花外在形貌像芙蓉。

（68） 我已得坐帝釋半座，我與帝釋<u>都無差別</u>，光光無異，色色無異，形形形無異，威儀禮節及其衣服亦無有異，唯眼眴異。（（東晉）僧伽提婆譯《中阿含經》495b）

（69） 甘蔗，……華大如酒盃，<u>形色</u>如芙蓉。（《齊民要術》卷十）

4. 「都」的語法化歷程

絕大多數的論著認為副詞「都」是由動詞「都」演變而來，而且動詞「都」又是從都城義的名詞「都」演變而來；黃瓚輝（2021）則認為，副詞「都」是直接由名詞演變而來的。筆者認為，「都」的都城義是由聚合義發展而來的，也就是說動詞義才是都城義的源頭。

[31] 例（66）「二王都不得餐」的「都」分析為範圍主語的較為多見，例如陳寶勤（1995: 67）、高育花、祖生利（1999: 66）、張誼生（2005: 57）、高育花（2007: 123）等；分析為程度副詞的較為少見，例如楊榮祥（1998: 315）。

會認為副詞「都」最初的源頭是都城義的名詞「都」，其中一個主要理由是文獻中幾乎沒有「都」用為動詞的例子。這當然也是事實，聚合義的「都」作為主要動詞之例確實是罕見。例（70）的「都」楊榮祥（2005: 100）釋為「集中在一起」之例，此例的「都」是否為即為此義或有仁智之見，但例（71）的動詞「都」為表示水流之「聚合」應無疑義。除了這兩例外，上文指出的「都受」、「都典」以及官名「都護」、「都督」等的「都」也還是可以分析為保有聚合義的動詞的。

（70） 蘇秦、張儀一當萬乘之主，而都卿相之位，澤及後世。(《史記・滑稽列傳》)

（71） 海岱及淮維徐州：淮、沂其治，蒙、羽其藝。大野既都，東原厎平。……淮海維揚州：彭蠡既都，陽鳥所居。……荊河惟豫州：伊、雒、瀍、澗既入於河，滎播既都，道荷澤，被明都。(《史記・夏本紀》)

「都」由動詞義發展為都城義的應是很自然的。從詞的語源來看，有不少地形名詞是來自動詞義的。「都」會獲得都城的意義或地位應該就是由於人的都聚而來。人的會聚逐漸成為聚落，有的會再進而發展為一個人口眾多且有領主號令的大都城，都城的「都」的命名就是由於人口大量匯集而來的。古人就以聲訓的方式來說明都城義的「都」的語源，如例（72）。此外也還有其他的地形之名是源自事物的都聚的，如例（73）。

（72） 國城曰都者，國君所居人所都會也。(《釋名・釋州國》)

（73） 澤中有丘曰都丘，言蟲鳥往所都聚也。(《釋名・釋丘》)

根據「都」的同源詞以及它在上古漢語文獻中的表現可以推斷，「都」本是指水流匯合而停聚的狀態或處所的。「都」與「瀦」為同源詞，二者在文獻中有互通之例。如例（71）的《史記》一段文字是援引《尚書・禹貢》之文的，這段文字中的四個「都」字在《尚書》都作「豬」。「豬」與「瀦」在《廣韻》為同音字，當為同詞異寫；《廣韻》釋「瀦」為「水所停也」，也是採自《孔傳》對《尚書・禹貢》「豬」的解釋。例（71）的「大野既都」，《集解》引孔安國曰：「水所停曰都。」例（71）的「彭蠡既都，陽鳥所居。」，《索隱》云：「『都』，古文《尚書》作『豬』。孔安國云『水所停曰豬』，鄭玄云『南方謂

都為豬』，則是水聚會之義。」《尚書・禹貢》的「大野既豬」，《孔傳》云：「大野，澤名，水所停曰豬。」《釋文》云：「豬，張魚反。馬云：水所停止深者曰豬。劉，東胡反。」[32] 從以上的注疏可知，「都」和「豬（瀦）」同為水聚會之義，形音之不同可能為方言之異。東漢的聲訓也可以看到「都」和水聚會之義的連繫，如例（74）。

（74） 湖者，都也，言流瀆四面所猥都也，川澤所仰以溉灌也。（《風俗通義・湖》）[33]

「都」的本義就是各方之水的匯聚，不同的源流順著趨勢自然匯聚在一處且進入一個蓄積的狀態。人物的自然會聚也就像水之匯聚一樣，因此人物的會聚也可以用「都」來指稱。流水或人物的自然會聚原本是非受迫的形成，中古漢語的「都」多少也還保有這種非受動的意含，相應的「都＋不及物動詞」句大都用的是狀態動詞，而主語通常也是受事或當事。[34] 根據以上所述，我們認為，中古漢語的副詞「都」是由動詞「都」發展而來的，而且名詞「都」與副詞「都」的發展是無關的。

那麼中古漢語的「都 d」和「都 q」是透過什麼途徑而產生的呢？

關於「都 d」的產生，張誼生（2005）和康振棟（2009）等都認為中古漢語「都」的語氣用法是常加在否定詞上而產生的。但我們也要問，是什麼造成「都」會常加在否定詞上呢？上古漢語的其他總括副詞也可以加在否定詞上，為什麼在中古漢語沒有發展為這種性質的副詞？至於「都 q」是怎麼產生的，除了黃瓚輝（2021）認為是由名詞「都」直接發展而來的，其餘都認為是由動詞「都」在連動式的環境下發展而來的。

我們先看中古漢語的「都」是怎樣的分布狀況，再來判斷「都 d」和「都 q」是怎麼產生的。

中古漢語的副詞「都」之用例似乎多屬「都 d」，「都 m」和「都 q」的佔比不高。不過如前述，有些用例似乎是介於「都 d」和「都 q」間的模糊地帶，要說是屬於哪一類都無不可；也有一些例子不好斷定是「都 m」還是「都 q」。實際上，中古漢語要歸入「都 q」而不會有爭議的例子是很少的。根據語料所呈現，就產生時期的先後而言，「都 m」是最早產生的，而典型的「都 q」應該是在「都 d」的流行之後才發展起來的。

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32 「東胡反」與《廣韻》的「都」字同音。

33 有的版本「猥」後無「都」字。

34 中古漢語的不及物動詞句可以觀察到「都」的受動性。在及物動詞句中作狀語的「都 m」最初似乎也多少反映了「都」的這個特點，如例（3）「都受天下委輸」中的「受」是非主動性的，與「都」的非主動性是相配合的。

中古漢語的「都 d」佔比特別高，與副詞「都」偏向搭配狀態性的謂語是密切關連的，[35] 因為狀態性的詞語本就具有可被程度副詞修飾的性質。中古漢語的「都」搭配的不及物動詞大都為狀態動詞；「都」搭配及物動詞時以「都＋否定詞」的為多，這種否定詞組也經常帶有狀態性；在肯定句中搭配的及物動詞也以狀態動詞或主動性不強的動詞為主，像例（26–30）中這種動作性較明顯的動詞在中古漢語的用例中比例就很低。中古漢語能確定為「都 q」的都是搭配動作動詞的，例子就很少。典型的「都 q」所搭配的動詞主要是具有位移徵性的，如及物動詞之例多為授與動詞，不及物動詞之例主要是移徙動詞。此外，在中古漢語時期，「都」無論搭配的是哪一類謂語，大都是指向謂語部分而不是限制主語的，這跟中古漢語「都」用法的形成也是關係密切的。

「都」的發展和它的動詞原義有密切的關係。首先，「都」的原義為「聚合」，這使得「都」的內部論元所指涉的事物一體化，相應的「都」也具有集合性。其次，「都」本是表示事物自然或非受迫的聚合，這使得它的內部論元經常為受事或當事，也使得它經常搭配狀態性的詞語。動詞「都」的這些性質在它作為狀語或連動式的第一個動詞時仍然能對句子的組構起到一定的制約作用。[36]

「都」在中古漢語時的發展可分從不及物動詞句和及物動詞句來看。

當「都」的謂語是不及物動詞時，「都」最初是用來表示一種主語所指涉之事物自然聚合為一個整體的情況，且隨後的動詞一般就會是表示這個聚合體順此下來會發生的狀態，而其中最容易被關注到的狀態應該是該聚合體之消失。這可以說明中古漢語的副詞「都」搭配的不及物動詞為什麼多為狀態動詞，而且最常見的是消失義的動詞。此時由於這種句子要凸顯的是主語聚合後所產生的狀況，因此「都」很自然就成為指向並強化謂語的一個詞；又由於「都」限制的是狀態動詞，當「都」的聚合義弱化，就很容易發展為強化謂語的程度副詞。其後，「都」的程度用法進而擴展到其他的狀態性謂語，包括不及物性質動詞（形容詞）、及物狀態動詞、具有狀態性的否定句等。[37] 此時「都」的論

35 具有狀態性謂語的句子例如狀態動詞句、受事主語句，此外否定句也常因否定而獲得狀態性。

36 中古漢語的「總」跟「都」一樣都是指向謂語的，那為什麼「總」不像「都」那樣發展為程度副詞而發展為不同功能的副詞？我們認為這與二者的來源以及它們在中古漢語時的用法有關。「總」原義為「束髮」，語義上是主動的把分散的頭髮聚集在一起，語法上是及物動詞。「總」的束髮動作本是人有意為之的，因此當「總」的語義擴展為一般的收聚義時，收聚動作還是維持為由主語主動管控的。與「總」的主動性有別，「都」的聚合原本是自然或非受迫的形成的，因此相對上，「總」的主動性本就是比「都」強的。這樣的「總」在中古漢語時期發展為副詞時，它的主語就一般為施事，而謂詞就一般為動作動詞；總之，當時「都」搭配的動詞主動性普偏弱於「總」搭配的動詞。

37 在否定句中，謂語的動作性很容易削減而趨同於狀態性，因而可以為程度副詞所修飾。此外，黃瓚輝（2021: 51）指出：「否定或消除義的一個共同的特徵就是不存在，或者由存在而變得不存在。」或許這也是「都」

元角色內含也有所變化，那就是「都」句中也容許可以不含有複數的論元了。原本「都」就具有把內部論元所指涉之物一體看待的作用，因此即使論元是離散的複數，也還是等如單體的；現在再加上「都」句已是以表示謂語的程度為主，論元的離散性就更為不顯了，就不妨以單數名詞來充任了。經過上述的發展，中古漢語「都 d」的整體面貌也就大體形成了。

在「都 d」流行之後，不及物狀態動詞句的「都 d」在受到其他總括副詞的影響下，通過關注重心的轉移而使人覺得主語也是「都」的限制對象。當「都」對謂語的強化作用沒那麼明顯時，「都」就相對凸顯出它對主語的總括作用了，也就進而重新分析為「都 q」了。只是我們目前還不確定，這條演變路線的重新分析是否在中古漢語就已完成。

中古漢語的「都 q」也有搭配不及物動作動詞的情況，例子罕見。這種情況動作動詞的義類很受限制，主要是表示位移的，如例（25）的「去」。推敲其產生的緣由，大概是因為事物聚合為一之後的下一步動作有很大的機率會是這個聚合體的一個移動。這種句子焦點本是投注在動詞上，久後「都」的聚合義消弱，最後「都」就重新分析為總括副詞了。

經過上述的發展歷程，中古漢語不及物動詞句的「都」不論是「都 d」還是「都 q」，所搭配的動詞一般偏為非賓格性，相應的它的主語也一般為受事或當事。

「都」發展為副詞還有另一條線，那就是搭配及物動作動詞的情況。

「都」搭配及物動作動詞的發展有幾個方向。一種是和動詞合起來表示使事物聚合為一體，也就是本文的「都 m2」；一種是和動詞合起來表示把東西聚合起來並加以統計，也就是本文的「都 m3」。這兩種發展的「都」因為都一直保持聚合義，因此其發展僅到方式副詞為止。「都」還可以搭配及物動作動詞來表示聚合各方的人或事物來進行某種行動，這種「都」也就是本文的「都 m1」。「都 m1」的發展就不僅限於方式副詞了，部分的「都 q」是由這種句子發展而來，只是這種「都 q」的例子在中古漢語時不僅仍然相當稀少而且使用的動詞也很有限制，主要是傳遞義的三元動詞。「都 m1」最早搭配的及物動作動詞是主動性弱的動詞，如例（3）「都受天下委輸」的「受」。這種例子的「都」雖具有把東西聚合在一起之義，但主動性不是那麼強，那些「天下委輸」是由各方往中央運送集中的，主語的收聚並不完全是自主的。這種「都 m1」的後續發展主要有兩個方向，其一是搭配的動詞是採用動作性並不很強的統領義或掌管義動詞，這種例子的「都」看來多少還保有聚合義；其二是搭配的動詞是採用含有位移徵性的動詞，主要是傳遞義

的程度副詞用法能順利從消失義狀態動詞擴展到否定句的一個重要因素。

的三元動詞，以授受動詞為多，如例（26）、（28）、（29）的「與」、「索」，可以看作是對例（3）的「受」這種動詞的承接，中古漢語這種例子的「都」大多可以分析為「都 q」。「都」最初會搭配這種動作動詞是因為把事物聚合後接著進行授受也是順勢而行的一種行為。這點可說是與上述的不及物動作動詞句的發展平行的，所搭配的動詞都是具有位移徵性的。搭配這類動詞的「都」的聚合義看來比較容易弱化和消失，易於演變為「都 q」。中古漢語語料中比較能確定為「都 q」的大都是搭配這類動詞的。「都 m1」和「都 q」有時很難辨別，因為二者形式上基本相同，不過形式相同是「都 m1」重新分析為「都 q」的必要條件。連動式的第一個動詞語法化為虛詞是漢語史經見的現象，「都 m1」雖仍具有聚合的語義，但作為連動式的第一個動詞，其聚合義易於消弱而最終成為總括賓語全體成員的「都 q」。[38] 如例（3）「都受天下委輸」大概是義為「匯聚且收受天下之委輸」，其中的「都」仍保持聚合義，因此仍為「都 m1」；而例（75）「彼亦都受」大概就是義為「全都接受」了，其中的「都」應已失去聚合義，就可視為「都 q」了。

（75） 諸象馬車金銀七寶王及我身一切，當盡如許所有并與一人，彼亦<u>都受</u>，猶無厭足。
（（姚秦）佛佗耶舍共竺佛念譯《四分律》962a）

總的來說，「都」原有的動詞義對於中古漢語的副詞「都」的語法化發展是保有一定的制約作用的。

以上構擬的「都」的語法化演變可以約示如圖（1）。

38 搭配及物動作動詞的「都 m」由於重心一直是在謂語，因此即使由「都 m」發展為「都 q」，所約束的論元也總是在謂語部分的動詞賓語或介詞賓語而不會是主語。

圖 1.「都」的語法化路徑

動詞　＞　方式副詞　＞總括副詞（集合性）＞總括副詞（分配性）
　　＞　程度副詞　＞總括副詞（集合性）＞ 總括副詞（分配性）

＊ 動詞「都」是在搭配及物動作動詞的情況下演變為方式副詞，在搭配狀態動詞的情況下演變為程度副詞。部分的方式副詞「都」後來又經由重新分析演變為集合性的總括副詞。「都」由動詞演變為程度副詞先是發生在搭配不及物狀態動詞之時，然後這樣的程度副詞用法再延伸到也能搭配及物狀態動詞而成為較為典型的程度副詞。程度副詞「都」重新分析為集合性的總括副詞的只是其中的一部分，主要也還是搭配不及物狀態動詞的。集合性的總括副詞「都」在近代漢語再發展為分配性的總括副詞。

＊ 集合性的總括副詞「都」產生於中古漢語時期，分配性的總括副詞「都」產生於近代漢語時期。

以上構擬的「都」的發展過程與以往主張動詞來源的說法同中有異。據黃瓚輝（2021: 36），過去主張總括副詞「都」由動詞發展而來的有三派：「動詞＞總括副詞」，例如陳寶勤（1995; 1998）；「動詞＞程度副詞＞總括副詞」，例如楊榮祥（1998）；「動詞＞程度副詞/總括副詞」，例如武振玉（2001）。武振玉（2001: 271）指出，「都」始則僅修飾動詞表方式，進而將語義指向這一動詞的前後成分，轉而為副詞。其語義指向前者表範圍；其語義指向後者，於肯定句中多表範圍，於否定句中則主要表程度。

就中古漢語「都」呈現的語言現象而言，這幾派都有解釋不到的地方。「動詞＞總括副詞」派會有如下的問題需要解決：如果只論及動詞演變為總括副詞，那麼中古漢語為什麼會有那麼大量的非總括副詞用例就缺乏交代了，而且當時能歸入總括副詞而無異議的例子也並非常見。「動詞＞程度副詞＞總括副詞」派會面臨如下的問題：一旦「都」成為典型的程度副詞時（就像那種句中無法找到可約束名詞的「都」），就應該不可能再演變為總括副詞。如果「都」全部都先變成純粹的程度副詞了，那總括副詞「都」就不太可能是由程度副詞「都」演變而來。我們認為只有性質本來就游移於程度副詞和總括副詞之間的「都」才比較有可能有這樣的演變。武振玉（2001）的「動詞＞程度副詞/總括副詞」觀點，[39] 表面上看這種雙線發展與本文構擬的演變過程相類，不過該文的「都」只是依據語義指向以及是否為否定句而分別轉為偏向表範圍或偏向表程度，可以說該文

[39] 武振玉（2001）列為程度副詞的「都」大抵為句中無法找到可約束的複數名詞那種，因此該文的總括副詞「都」含蓋的範圍其實比本文大很多。

表程度的「都」和總括事物範圍的「都」是同時存在而不是先後發展的。但我們認為，「都」的程度副詞與總括副詞的成立事實上是有時間差的，而且二者各自的發展還需把動詞的動作性與義類納入考慮。

我們認為，構擬「都」的語法化演變，至少應能妥適的解釋中古漢語的「都」在使用上為何有如下的情況：中古漢語的「都」為何以程度副詞用法為主而典型的總括副詞仍然不多？為什麼「都」的總括副詞用法、程度副詞用法與謂語的狀態性、動詞的及物性以及義類有密切的相關性？中古漢語典型的總括副詞「都」為何搭配動作動詞是以表位移的為主，而且主要是出現在四五世紀之後？本文所擬的「都」的演變路線，就是基於「都」用法的歷史進程並嘗試解答上述這些問題而構擬出來的。

5. 結論

中古漢語時期是「都」發展為副詞的初期，它的用法和現代漢語的「都」很不一樣。本文把中古漢語的副詞「都」分為三種用法：(1)「都 m」，保有動詞「聚合」義，介於動詞與方式副詞之間。「都 m」又有三種用法：「都 m1」，表示聚合各方的人或事物來進行某種行動；「都 m2」，「都」與後面的動詞合起來表示使事物合為一體；「都 m3」，義如「總（合）」，與後面的動詞合起來義如「總計」。(2)「都 d」，程度副詞，最常見的形式是搭配否定詞，意義相當「完全」，是中古漢語用例最多的一類。(3)「都 q」，總括副詞，但性質有別於現代漢語的「都 1」。中古漢語的「都 m」、「都 d」這兩種用法是上古漢語的總括副詞所沒有的，「都 q」的用法也與上古漢語的總括副詞有所區別；因此「都」是一種具有新功能的副詞，它的興起與流行對於上古漢語的總括副詞系統是有功能增補作用的，並非只是副詞的新舊替換而已。

繼分類之後，本文接著討論中古漢語的「都 d」與「都 q」的分際問題。中古漢語的「都 d」與「都 q」間的分際較為模糊，部分用例在歸類上是有爭議的。中古漢語「都」的歸類會常有爭議，最主要是因為當時有不少的「都」例在判斷為「都 d」與「都 q」時會有莫衷一是的情況發生。我們認為，中古漢語「都 d」與「都 q」間的歸類並不是簡單的一刀切的問題。中古漢語的「都」會有這種歸類問題，可以從「都」的詞義來源以及其在中古漢語的功能來探究其因。「都」的核心義本為「聚合」，中古漢語副詞「都」的發展多少仍受到這個語義的制約。一方面中古漢語副詞「都」很容易搭配狀態性謂語來表現這個聚合力量所造成的結果，相應的「都」也就很容易成為對謂語有強化作用的副

詞；另一方面，「都」既源自事物之聚合，它又本非與量無涉。因此對於一個含有複數名詞的狀態動詞句來說，要說「都」是具強化作用還是具總括作用就很容易成為見仁見智的結果。以不及物狀態動詞句為例，當我們著眼在主語，就會覺得「都」是總括副詞；著眼在謂語，就會覺得「都」比較像是程度副詞。

中古漢語的總括副詞「都」是集合性的而不是分配性的，這是本文提出的一個新觀點。借著與副詞「皆」的比較，本文從以下幾方面來證明中古漢語的「都」應當是集合解而非分配解：(1)當「都」句的動詞賓語為數量詞組時，不存在分配的解讀；(2)「都」與重疊詞不並用；(3)「都」與「各」不並用；(4)「都」與「相」不並用；(5)「都」所搭配的謂詞有特定的限制。

以下簡述本文對中古漢語副詞「都」的語法化的看法。

雖然本文同意多數學者的看法，認為中古漢語的副詞「都」是由動詞「都」發展而來的；但是跟以往學者看法不同的是，我們認為動詞「都」不是由名詞「都」發展而來，相反的，「都」的都城義是由聚合義發展而來的；也就是說，在副詞「都」發展過程中，名詞「都」並未參與其中。

「都」是發展為「都 d」還是發展為「都 q」，與其謂語是否具狀態性是密切相關的。

當副詞「都」以不及物狀態動詞為謂語時，最初要凸顯的是主語聚合後所產生的狀況，因此副詞「都」原先就具有強化謂語的作用，一旦「都」的聚合義弱化，也就發展為強化謂語的程度副詞。其後，「都」的程度用法進而擴展到其他的狀態性謂語，包括不及物性質動詞（形容詞）、及物狀態動詞、具有狀態性的否定句等。當「都」句進而容許可以搭配不含有複數的論元時，中古漢語「都 d」的整體面貌也就大體形成了。

在「都 d」流行之後，不及物狀態動詞句的「都 d」在受到其他總括副詞的影響下，通過關注重心的轉移而使人覺得主語也是「都」的限制對象。當「都」對謂語的強化程度沒那麼明顯時，「都」 就相對凸顯出它對主語的總括作用，也就進而重新分析為「都 q」了。只是我們目前還不確定，這條演變路線的重新分析是否在中古漢語就已完成。

中古漢語的「都 q」也有來自搭配不及物動作動詞的情況。這種情況動作動詞義類很受限制，主要是表示位移的。這種句子焦點本是投注在動詞上，久後「都」的聚合義消弱，最後「都」就重新分析為總括副詞了。中古漢語的「都 q」還有來自搭配及物動作動詞的，這條線的源頭就是本文的「都 m1」。受到原來的動詞義的影響，「都 m1」句採用的及物動作動詞義類有一定的傾向，主要是統領義、掌管義動詞或者傳遞義動詞。搭配傳遞義動詞的「都 m1」聚合義比較容易弱化，進而重新分析為總括賓語全體成員

的「都 q」。考察中古漢語語料，由搭配動作動詞而發展出來的「都 q」在中古漢語應已產生，只是例子還不多。

總的來說，「都」原有的動詞義對於中古漢語的副詞「都」的語法化發展是保有一定的制約作用的。

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The adverb *dou* in Middle Chinese

The period of Middle Chinese was an early stage in the development of *dou* 都 into an adverb, and its usage differed significantly from that of *dou* in modern Chinese. The main points of this paper are as follows: (1) describing the various usages of *dou* in Middle Chinese; (2) providing several pieces of evidence to support the notion that *dou*, when binding the subject in Middle Chinese, was only interpreted collectively, and the distributive reading had not yet been developed during that time; (3) explaining the evolution of the usage of *dou* in Middle Chinese.

Keywords: adverb *dou* 都, Middle Chinese, distributive reading, collective reading, adverb of degree

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Are there prepositions in Tanan Rukai? Another look in a comparative perspective

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The goal of this paper is two-fold. On the synchronic level, it demonstrates that there are no prepositions in Tanan Rukai, as argued in P. Li (1973), and that no convincing arguments can be adduced to posit their existence in any of the five other Rukai dialects (i.e., Maga, Tona, Mantauran, Budai, Labuan). Through a review of P. Li's (1973) work, I actually show that what he had previously treated as prepositions are either affixes that attach to (pro)nominal bases or verbs. As these morphemes are also found in all of the Rukai dialects, a reconstruction of the locative, directional, and instrumental verbal paradigm can be achieved on the diachronic level, as part of a larger comparative study of Rukai.

Keywords: Rukai, Formosan language, comparative study, prepositions, reconstruction, Proto-Rukai

1. Introduction

A preposition usually encodes notions of time or space and typically combines with a noun phrase to form a larger (prepositional) phrase which modifies a verb or functions as a predicate. Among the very few Formosan languages which exhibit prepositions, Amis and Paiwan retain the Proto-Austronesian locative preposition *i 'LOC' (Blust 2013: 400), as shown in (1) and (2).

(1) Amis

a. *maroq* *kako* ***i*** ***Taypak***.
live 1SG.NOM PREP Taipei
'I live in Taipei.' (adapted from Wu 2006: 297)

b. *pa-qaca* *kako* *to* *codad* ***i*** ***wawa***.
CAUS-give 1SG.NOM DAT.CN book PREP child
'I sold the book to the child.' (adapted from Wu 2006: 84)

c. *mi-ka-ranam* *kako* ***i*** ***ci*** ***kaka-an***.
AV-KA-have.breakfast 1SG.NOM PREP PN older.sibling-DAT
'I am going to (my) brother's place to have breakfast.' (adapted from Wu 2006:166)

(2) Paiwan

a. *mangtjez* ***i*** ***qakav***.
AV:arrive PREP Pingtung
'They arrived in Pingtung.' (Kuljaljaw variety)

b. *pi-vavav-u* ***i*** ***tua*** ***cekui*** *a-za* *sunatj.*
CAUS.LOC-above-IMP PREP OBL.CN desk NOM.CN-that book
'Put that book on the desk.' (Saichia variety, adapted from Chang 2006: 117)

c. *i-zuua~zuua* *ti* *Kalalu* ***i*** ***ti-a*** ***Zepul***.
at-RED~there NOM.PN Kalalu PREP OBL.PN-PL Zepul
'Kalalu is living at Zepul's place.' (Saichia variety, adapted from Chang 2006: 117)

As shown in (1) and (2), the preposition *i* can precede locative nouns (e.g., place names) and common nouns or proper nouns referring to a location. Note that in Amis, locative and common nouns are immediately preceded by the preposition without any marker (i.e., a case marker or a noun class marker) in between (1a–b); proper nouns, on the other hand, take a noun class marker which follows the preposition *i* (1c). In Paiwan, on the other hand, locative nouns are unmarked for case (2a), but common nouns and proper nouns are preceded by a case marker, which also marks noun class (2b–c) (see Huang et al. 1998).

The distinction between case markers and prepositions is very tenuous (Payne 1997: 86). In Amis and Paiwan, the preposition *i* – which introduces a noun or a noun phrase and encodes a location (1a–b), (2b–c) or a direction (1c), (2a) – is treated as such by default because of its co-occurrence with a case marker or a noun class marker. In Puyuma (Teng 2018; 2022), on the other hand, the reflex of the PAN preposition *i is part of the case marking system; it is even homophonous with the nominative case marker *i*, as shown in (3).

(3) Katripul Puyuma

ulra ***i*** ***patraran*** *i* *nani.*
be.at LOC outside NOM.PN my.mother
'My mother is outside.' (adapted from Teng 2018: 80)

P. Li (1973) argues that there are four prepositions in Tanan Rukai, which are "derived" (i.e., grammaticalized) from verbs. This claim needs to be re-evaluated from two different perspectives. The first is synchronic and the second diachronic. On the synchronic level, the fact that so-called prepositions are found in the Tanan dialect, but in no other Rukai dialect (and more generally in most Formosan languages), needs to be explained. If the status of prepositions is

valid in Tanan Rukai, we also need to examine how prepositions came into existence in this dialect from a diachronic perspective, in order to determine the history of the Rukai dialects. Conversely, if there are no prepositions in Tanan Rukai, we need to determine the status of the forms which encode a locative, directional, and instrumental meaning.

This paper is part of a larger research project (Zeitoun 2003, in preparation) representing a comparative study of the six Rukai dialects (Maga, Tona, Mantauran, Budai, Labuan, and Tanan), located in southern Taiwan and stretching from Kaohsiung City in Maolin District to Pingtung and Taitung Counties. It aims to examine P. Li's (1973) claim that four verbs have been grammaticalized as prepositions in Tanan Rukai (§2), and demonstrate that his hypothesis is actually not valid (§3). There are no prepositions in Tanan, and the forms he analyzed as prepositions are either verbs or affixes (§4) which are also found in the five other Rukai dialects (§5), and can therefore be reconstructed to Proto-Rukai (§6).

2. From verbs to "prepositions" in Tanan Rukai

P. Li (1973: 111ff) proposes to divide four prepositions *'a(kai)* 'at', *twalay* 'from', *'akela* 'to', and *ara* 'with' in two groups, his classification being based on the [-/+] locative feature of each form. With the exception of *ara* 'with' (4a), which marks an instrumental relation, the other prepositions encode spatial (or locative) relations. The preposition *'akai* 'at' is treated as non-directional (4b), *'akela* 'to' and *twalay* 'from' as directional (4c), and are further divided as indicating a goal or a source (4d).

(4) Tanan Rukai

a. *kya'a'acay* *kay* *comay* ***ara*** *kwang.*
was.killed this bear with [PREP] gun[1]
'This bear was killed with a gun.' (adapted from P. Li 1973: 124)

b. *loa* ***'akai*** *ino* *koadra* *lalak=li.*
if at [PREP] where that child=my
'It is not known where my child is.' (adapted from P. Li 1973: 120)

[1] Whenever necessary and in order to avoid discrepancy in terminology, I have changed P. Li's (1973) abbreviations. Following the Romanized writing system promulgated by the Council of Indigenous Peoples and the Ministry of Education (2005), I have also changed his transcriptions as follows: the high central vowel *ɨ* is transcribed as a schwa *e* /e/, the high vowel *u* as *o* /o/, the vowel *i* /i/ is written as a glide *y* /j/ after the vowel *a*, the retroflex voiced stop *D* as *dr* and the retroflex lateral *L* as *lr*. Whenever *i* and *o* occur before *a*, the sequence is glided as *ya* and *wa*, e.g., *kya'a'acay* 'was killed' (< *ki-a-'a-'acay* [PASS-REAL-CAUS-die]), *watubi* 'cry/cried' (< *o-a-tobi* [ACT-REAL-cry]). I adopt this orthography in this paper, unless a certain dialect does not have any (phonemic) glide.

c. *'akela* *ino* *kay* *daedae=so?*
to [PREP] where this land=your
'How far is this land of yours?' (adapted from P. Li 1973: 122)

d. *kayvay* *drakeral* *moalodr* ***twalay*** *omaoma* *'akela* *ladrek.*
this river flow from [PREP] field up.to [PREP] sea
'As for this river, it flows from the field to the sea.' (adapted from P. Li 1973: 122)

P. Li (1973: 112) makes two important claims. First, he mentions that both prepositions and case markers ("determiners" in his terms) "signal case forms" but differ in that (i) prepositions only mark the locative and instrumental nouns (see Table 1 and examples (4a–d)), while case markers precede the subject (i.e., the nominative NP) and the object, as in (5). In other words, according to him, so-called prepositions and case markers occur in complementary distribution and never co-occur together and this is somehow different from what we find in other Formosan languages.

(5) Tanan Rukai
wabaay *nakoa* *sa* *omas* *'a-si-lalak* ***ko*** *tina=li*
gave me OBL person cause-raise-child NOM mother=my
(lit.) 'My mother gave me to someone to raise me.'
'My mother had a person raise me.' (adapted from P. Li 1973: 72)

Second, P. Li (1973: 111ff) argues that prepositions are presumably all lexically derived from the following verbs *arakay* 'use', *yakay* 'exist, be at',[2] *wa['a]kela*[3] 'arrive, reach' and *twalay* 'from', as shown in Table 1 (P. Li 1973: 111ff).

Table 1. Verbs and their prepositional counterparts in Tanan Rukai (Based on P. Li 1973: 111)

Lexically derived preposition	Gloss	Verb	Gloss
ara	'with'	*arakay*	'use'
'a(kai)	'at'	*yakay*	'be at, exist'
'akela	'to'	*(wa)kela*	'arrive'
		wa'akela	'cause to arrive'
twalay	'from'	*'atwalay*	'get from'

[2] The verb *yakay* can be decomposed as the locative prefix *i-* 'at' followed by the realis marker *a-*, both affixes attaching to *kay* 'this' (< *i-a-kay* [LOC-REAL-this] 'be at'; see Zeitoun et al. 1999). When marked as subjunctive (when it appears embedded after another verb) or as non-finite when it follows the conjunction *la* 'and', it occurs as *i-kay*, i.e., without the realis marker *a-*.

[3] None of our consultants accept the form *wa'akela* (< *o-a-'akela*), and all agree on *wakela* (< *o-a-kela*) 'arrive, reach', as discussed in §3.3.

The use of these so-called prepositions given in (4a–d) can be compared with that of verbs they are said to be derived from in (6a–d).

(6) Tanan Rukai

a. ***arakay*** *inia balbal o-athak kikay romay kay lrolay.*
use OBL bamboo SBJV-break this bowl this child
'This child broke this bowl, using a [piece of] bamboo.' (adapted from P. Li 1973: 124)

b. *watobi* ***i-kay*** *daan kay lrolay.*
cried at-this house this child
'This child cried in the house.' (adapted from P. Li 1973: 120)

c. ***wa'akela****=su' akai ino?*
arrived=2SG.NOM at [PREP] where
'Where did you arrive?' (adapted from P. Li 1973: 122)

d. ***'atwalay****=ako inia lrolay sa lrima ka 'ayso.*
get.from=1SG.NOM that child OBL five OBL money
'I got five dollars from that child.' (adapted from P. Li 1973: 122)

To show the relationship between verbs and grammaticalized prepositions, P. Li (1973: 121) indicates that they may occur in the same sentence (7a), the verb occurring before the preposition. However, they cannot be used interchangeably, as shown in (7b):

(7) Tanan Rukai (adapted from P. Li 1973: 121)

a. *akay-nga 'akai ino koadra kyaani'alay sa sasevera?*
be.at:REAL-COS at [PREP] where that was.blown OBL wind
(lit.) 'Where is that which has been blown by the wind?'
'Where is (the thing) which was blown by the wind?'

b. *koani ababay waswaswa'* ***'akai/*ikay*** *ino?*
that woman be.sweeping at [PREP]/*be.at where
'Where is that woman sweeping?'

P. Li (1973) correctly shows that there is a close resemblance between two sets of morphemes, cf. *yakay* 'exist, be at' vs. *'akai* 'at', *arakay* 'use' vs. *ara* 'use', *(wa)['a]kela* 'arrive, reach' vs. *'akela* 'to', *twalay* 'from' vs. *'atwalay* 'get from'. However, convincing as his analysis may be—it will be unfolded upon in greater detail in the section to follow—it is clear that a number of contradicting pieces of evidence invalidate his claim regarding the existence of prepositions in Tanan Rukai.

In the following section, I shall demonstrate that there are no prepositions in Tanan Rukai and further explain how the morphemes which P. Li (1973) identifies should be analyzed. All the examples given come from my own fieldnotes, unless otherwise indicated.

3. A reassessment of P. Li (1973)

Below, I shall show that there are two major problems with P. Li's (1973) analysis. The first has to do with the distribution of these so-called prepositions. The second concerns the form and internal composition of these morphemes, as well as their bound or free status. I shall thus demonstrate—were these morphemes analyzed correctly—that the tests that P. Li (1973: 145) proposes to distinguish so-called prepositions from verbs (P. Li 1973: 145) are not applicable.

In the following, I examine each of the morphemes *'a-ka-* 'at' (rather than ***'akai*, which is not correct), *ara-* 'with' (rather than ***ara*), *'akela* 'to', *twalay* 'from' in turn (see §3.1–§3.4, respectively). In §3.5, I discuss another morpheme, *'asiakay* 'do for', which belongs to the same paradigm. A short summary is given in §3.6.

3.1 'a-ka- vs. yakay 'at' (Li's 'a(kai) vs. yakay)

P. Li (1973: 145) mentions correctly that verbs carry TAM information when they function as the matrix verb. In (8a), the data has been reanalyzed, and *a-* is interpreted as a realis marker rather than a past tense marker, but this does not undermine P. Li's (1973) analysis. When verbs occur in embedded position, they are in their bare forms, as in (8b) (see also Footnote 2 above).

(8) Tanan Rukai

a. ***i-a-kay*** *inia daan tobi kay lrolay.*
at-REAL-this that house SBJV:cry this child
'This child cried in that house.'

b. *o-a-tobi* ***i-kay/*i-a-kay*** *inia daan kay lrolay.*
ACT-REAL-cry at-this/at-REAL-this that house this child
'This child cried in the house.' (adapted from P. Li 1973: 120)

One obvious problem regarding *'a(kai)* 'at' is that it cannot replace *ikay* (*i-kay*) 'be at' before locative NPs though such a distribution would qualify this morpheme as a preposition. Compare the grammatical contrast of (9a–b):

(9) Tanan Rukai

a. *watobi i-kay Ø daan kay lrolay.*
cried at-this Ø house this child
'The child cried in the house.' (adapted from P. Li 1973: 120)

b. **watobi 'akai Ø daan kay lrolay.*
cried at Ø house this child

P. Li (1973: 126) mentions that prepositions are never followed by case markers but we notice that although *'a(kai)* is followed by *daan* 'house' without any case marker in (9b), this example is ungrammatical. The question that arises is, "Why?"

Next, P. Li's (1973: 117) transcription of the form *'a(kai)* implies that *'a* is either a free morpheme or that it can co-occur with any noun. However, none of our consultants accepted *'a* with a noun, as shown by the ungrammaticality of **'a lrabin*/**'a-lrabin* 'on the cheek', and none accepted the form *'akai*, as demonstrated by the ungrammaticality of *'akai daan* in (9b).

Actually, there are a couple of reasons to argue that ***'a(kai)* 'at' has been misidentified and should be analyzed as the bimorphemic prefix *'a-ka-*, made up of the directional prefix *'a-* 'DIR' (< PAN/PR[4] *pa- 'DIR') and the allative prefix *ka-* 'ALL' (Zeitoun & Chang 2017).

First, the distribution of *'a-ka-* 'at' is extremely restricted: it occurs mostly with a demonstrative pronoun, e.g., *inia* 'that [+vis]' or *idraa* 'that [-vis]', as in *'akainia* 'here [+vis]' (10a) and *'akaidraa* 'there [-vis]' (10a) or an interrogative marker *ino* 'where', as in *'akaino* (10b).

(10) Tanan Rukai

a. *i-a-kay* ***'a-ka-inia*** *tobi~tobi* *kay* *lrolay?*
at-REAL-this DIR-ALL-there SBJV:RED~cry this child
'The child is crying there.'

b. *i-a-kay* ***'a-ka-ino*** *tobi~tobi* *kay* *lrolay?*
at-REAL-this DIR-ALL-where SBJV:RED~cry this child
'Where is the child crying?'

Note that both demonstrative and interrogative pronouns all start with the vowel *i*, and this might explain P. Li's (1973) confusion as for the morpheme **'akai*, instead of *'a-ka-*. Another possibility would be to analyze this morpheme as ***'a-ka-i*, but no geminate vowels are heard

[4] The Proto-Rukai (PR) voiceless stop **p* is reflected as a glottal stop' in Tanan Rukai.

and nothing (internal to Tanan Rukai or in a comparison with the other Rukai dialects) attests to such a form.

This restriction is further illustrated by the ungrammaticality of (11a–b) below, which confirms that *'a-ka-* cannot attach to just any locative noun, as opposed to (11c–d), where *latadre* 'outside' is introduced by the existential/locative verb *yakay* 'exist, be at' (< *i-a-kay* [LOC-REAL-this]).

(11) Tanan Rukai

a. ***'a-ka**-latadre* *o-aga~aga* *ko* *tina=li.*
DIR-ALL-outside SBJV-RED~cook NOM mother=1SG.GEN

b. **o-a-aga~aga* ***'a-ka**-latadre* *ko* *tina=li.*
ACT-RED~cook DIR-ALL-outside NOM mother=1SG.GEN

c. ***i-a-kay*** *latadre* *o-aga~aga* *ko* *tina=li.*
at-REAL-this outside SBJV-RED~cook NOM mother=1SG.GEN
'Mother is outside cooking.'

d. *o-a-aga-aga* ***i-kay*** *latadre* *ko* *tina=li.*
ACT-RED~cook SBJV:at-this outside NOM mother=1SG.GEN
'Mother is cooking outside.'

Second, the distribution of *'a-ka-* 'at' depicted above explains why, in (12), the existential verb *i-kay* 'be at' cannot replace *'a-ka-* 'at'. While the bimorphemic prefix *'a-ka-* can (only) occur with *inia* 'here', *idraa* 'there', *ino* 'where' (see also (10)), the (bare) verb *i-kay* (or its alternant form *i-a-kay*) must introduce a noun encoding a spatial or locative meaning (see (9) and (11)).

(12) Tanan Rukai

a. *la* *davac=nai* ***'a-ka**-idraa.*
and leave=1PL.EXCL.NOM DIR-ALL-there
'We left there.' (adapted from P. Li 1975: 165)

b. **la* *davac=nai* ***i-kay*** *idraa.*
and leave=1PL.EXCL.NOM at-this there

P. Li's (1973) analysis raises another problem. Generally speaking, a preposition introduces an NP and is expected to occur in predicate position. However, this assumption is not borne out in Tanan Rukai, as shown by the ungrammaticality of (13b) and (13c), which shows it cannot occur in initial position (13b), or be the host of a nominative pronoun (13c).

(13) Tanan Rukai

a. *w-a-tobi~tobi* ***'a-ka-ino*** *kay* *lrolay?*
ACT-REAL-RED~cry DIR-ALL-where this child
'Where is the child crying?'

b.* ***'a-ka-ino*** *tobi~tobi* *kay* *lrolay?*
DIR-ALL-where SBJV:RED~cry this child

c.* ***'a-ka-ino=so*** *tobi~tobi?*
DIR-ALL-where=2SG.NOM SBJV:RED~cry
Intended for: 'Where did you cry?'

Two different constructions are found: in the first, the clause is headed by the existential verb *yakay* 'exist, be at' (< *i-a-kay*), followed by the sequence *'a-ka*-X 'at X' (where X refers to *ino* 'where', *inia* 'here', *idraa* 'there'), as shown in (10). In the second, the main lexical verb occurs in initial position and is followed by the *'a-ka*-X 'at X', as in (14). Since *'a-ka*-X 'at X' never occurs in initial position (13b), never takes any pronominal clitic (13c), and modifies the predicate (14a–b), this morpheme can be analyzed as an adverb.

(14) Tanan Rukai

a. *w-a-tobi~tobi* ***'a-ka-ino*** *kay* *lrolay?*
ACT-REAL-RED~cry DIR-ALL-where this child
'Where is the child crying?'

b. *w-a-tobi~tobi* ***'a-ka-inia*** *kay* *lrolay.*
ACT-REAL-RED~cry DIR-ALL-here this child
'The child is crying there.'

Finally, P. Li (1973: 121ff) points out that in embedded position, verbs are marked as subjunctive and take the infix <*o*> (pronounced /w/ before /a/) in embedded position if the stem begins with a consonant followed by the low vowel /a/ but so-called prepositions do not. If *'a-ka-* is understood as a bimorphemic prefix, then it explains why it cannot further take the infix <*o*>.

(15) Tanan Rukai

a. *koani* *marodrang* *arakay* *inia* *balbal* ***dwamek*** *inia* *taw'ong.*
that old.(wo)man use that bamboo SBJV:beat that dog
'As for that old man, he used that bamboo to beat that dog.' (adapted from P. Li 1973: 123)

b.**koani marodrang arakay inia balbal* ***damek*** *inia taw'ong.*
that old.(wo)man use that bamboo beat that dog

(16) Tanan Rukai
a. *koani ababay waswaswa'* ***'a-ka-ino****?*
that woman be.sweeping DIR-ALL-where
'Where is that woman sweeping?' (adapted from P. Li 1973: 121)
b.**koani ababay waswaswa'* ***'<o>a-ka-ino****?*
that woman be.sweeping <SBJV>DIR-ALL-where

In this section, I have shown that there are indeed two forms, *yakay* 'exist, be at' (< *i-a-kay*) and its base form *ikay* (< *i-kay*), which is an existential/locative verb and *'a ka-*, which is a bimorphemic prefix attaching to the demonstratives *inia* 'here', *idraa* 'there' and the interrogative pronoun *ino* 'where'; together these forms function as adverbs which differ from verbs in that they cannot appear in predicate position, cannot be hosts to second-position nominative clitics; on the other hand, they modify the verb they follow.

3.2 ara- vs. ara-kay 'use' (Li's ara vs. ara-kai)

The next form to be examined is *ara-* 'use', which is analyzed in P. Li (1973) as an instrumental preposition as opposed to the instrumental verb *ara-kay* 'use'. P. Li (1973: 126) claims that in Tanan Rukai a preposition is never followed by a case marker, as shown in (17). In (17a), *ara* is followed by *kwang* and is grammatical; it is ungrammatical when directly followed by *sa* 'OBL' (17b). By opposition, a verb can be followed by a determiner preceding the object, as in (17c). These examples thus seem to confirm P. Li's (1973) analysis.

(17) Tanan Rukai (adapted from P. Li 1973: 126)
a. *kya'a'acay kay comay* ***ara*** ***Ø*** ***kwang****.*
was.killed this bear with [PREP] Ø gun
'This bear was killed with a gun.'
b.**kya'a'acay kay comay* ***ara*** ***sa*** ***kwang****.*
was.killed this bear with [PREP] OBL gun
c. *kya'a'acay kay comay* ***ara-kay*** ***sa*** ***kwang****.*
was.killed this bear use-this OBL gun
'This bear was killed with a gun.'

However, if *ara* were a free morpheme, as suggested by P. Li (1973: 126), it would be able to attract nominative pronouns which are second position clitics in this language. This is not possible, however, as shown in (18) and this ungrammaticality implies that *ara-* is a bound (rather than a free) morpheme and more specifically a prefix, and thus cannot attract any pronoun.

(18) Tanan Rukai

*****ara**=ako balbal o-athake inia romay.*
use=1SG.NOM bamboo SBJV-break that bowl
'I used bamboo to break the bowl.'

Here again, it is also important to understand the internal composition of each morpheme/word. Just as in the verb *yakay* (< *i-a-kay*) 'exist, be at', in *arakay* 'use' (< *ara-kay*), *kay* is the base; it is an adnominal demonstrative meaning 'this'. Whether *ara-* is followed by the demonstrative *kay* 'this' or whether it attaches to a noun, the derived form is a verb which can occur in initial position, as in (19a–b) or in clause medial-position, as in (19c–d); *ara-* can thus be treated as a verbalizer.[5]

(19) Tanan Rukai

a. ***ara-kay**=ako balbal o-athake inia romay.*
use-this=1SG.NOM bamboo SBJV-break that bowl
'I used bamboo to break the bowl.'

b. ***ara-balbal**=ako o-athake inia romay.*
use-bamboo=1SG.NOM SBJV-break that bowl
'I used bamboo to break the bowl.'

c. *o-a-athak=ako inia romay **ara-kay** (sa) balbal.*
ACT-REAL-break=1SG.NOM that bowl use-this (OBL) bamboo
'I broke the bowl using bamboo.' (Adapted from P. Li 1973: 124)

d. *o-a-athak=ako inia romay **ara-balbal**.*
ACT-REAL-break=1SG.NOM that bowl use-bamboo
'I broke the bowl using bamboo.'

[5] Whether or not the genericity or the definiteness of the object is induced by the alternation between *ara-kay* vs. *ara-*N needs to be further investigated and is ill-understood at this point (see Teng 2024).

3.3 ’a-kela ‘to’ vs. wakela (< o-a-kela) ‘arrive’ (Li’s ’akela ‘to’ vs. wa’akela ‘arrive’)

P. Li (1973: 122) does not say much about *’akela* ‘to’ (20a), which he treats as a preposition as opposed to the verb *kela* ‘arrive’ (20b). He gives an interesting example, repeated in (20b) and reanalyzed in (20c), whereby *kela* is given as *wa-’akela* ‘arrived’. As mentioned in Footnote 3, none of our informants agree with the form *wa’akela* ‘arrived’.

(20) Tanan Rukai

a. ***’akela*** *ino kay daedae=so?*
to [PREP] where this land=your
‘How far is this land of yours?’ (adapted from P. Li 1973: 122)

b. ***wa-’akela=so*** ***’akai*** ***ino****?*
PAST-arrive=you at where
‘Where did you go?’ (adapted from P. Li 1973: 122) (Note: example rejected by informants)

c. ***o-a-kela=so*** ***’a-ka-ino****?*
ACT-REAL-arrive=2SG.NOM DIR-ALL-where
‘Where did you go?’ (Author’s reanalysis of (20b))

The morpheme *o-a-kela* ‘arrive, reach’ (21a) and its non-finite/subjunctive alternant forms *kela* (21b–c) only function as verbs encoding a spatial meaning.

(21) Tanan Rukai

a. ***o-a-kela****-nga=ako* *taromak.*
ACT-REAL-arrive-COS=1SG.NOM Taromak
‘I have already reached the (village of) Taromak.’

b. ***sa*** ***kela-nga*** *ko tama=ini, ma-draw-nga kay lrolay.*
when NFIN:arrive-COS NOM father=3SG.GEN STAT-big-COS this child
‘When his/her father arrived, the child was already big.’

c. *twaladh=ako*[6] *taihoko* ***kela*** *taromak.*
come.from=1SG.NOM Taipei SBJV:reach Taromak
‘I came from Taipei to the (village of) Taromak.’

[6] The glide *y* becomes *dh* in Tanan, Labuan and Budai before the vowel *a* when prefixation or cliticization takes place, e.g., *twalay* ‘from’ > *twaladhako* ‘I come from’.

The derived form *'a-kela* 'up to' cannot replace the verb *(w-a-)kela* 'arrive, reach'. Compare the grammaticality of (22a–b) and (22a'–b').

(22) Tanan Rukai

a. ***w-a-kela**-nga=(a)ku* *taromak.*
ACT-REAL-reach-COS=1SG.NOM Taromak
'I have already reached the (village of) Taromak.'

a'.****'a-kela**-nga=(a)ko* *taromak.*
DIR-up.to-COS=1SG.NOM Taromak

b. *twaladh=ako* *taihoko* ***kela*** *taromak.*
come.from=1SG.NOM Taipei SBJV:reach Taromak
'I came from Taipei to the (village of) Taromak.'

b'.**twaladh=ako* *taihoko* ***'akela*** *taromak.*
come.from=1SG.NOM Taipei up.to Taromak

Just like *(w-a-)kela* 'arrive, reach', *'a-kela* 'up to' is also a verb. The contrast between (23a–a') and (23b–b') shows that it can occur both in initial and in medial position, just like any other verb.

(23) Tanan Rukai

a. ***'a-kela**-nga=nako* *thingale* *taromak* *kay* *kakodha.*
DIR-up.to-COS=1SG.NOM SBJV:know Taromak this folktale
'I understand Taromak folktales up to (this point).'

a'.*o-a-thingale-nga=nako* ***'a-kela*** *taromak* *kay* *kakodha.*
ACT-REAL-know-COS=1SG.NOM DIR-up.to Taromak this folktale
'I understand Taromak folktales up to (this point).'

b. ***'a-kela*** *kayasa,* *lo* *kidremedrem=ako* *ki*
DIR-up.to now if think=1SG.NOM OBL
na-ta-ku-laub-an=nai *'atenga*
late-LOCNMLZ-NAGT.PASS-burn-LOCNMLZ=1PL.EXCL.NOM really
la *ya=ako* *kiraragay* *ki* *twaomas.*
then so=1SG.NOM happy OBL God
'Until now, as I think about those burned (places) of ours, we should really be grateful to God.' (Adapted from Li 1975: 27, Text 2)

b'. *kalalekete=so* *kialre* ***'a-kela*** *idraa?*
can=2SG.NOM attend DIR-up.to that
'Can you attend at that time?'
(lit.) 'Can you attend up to that time?'

The semantics of *(w-a-)kela* 'arrive, reach' and *'a-kela* 'up to' differs; thus, *(w-a-)kela* 'arrive, reach' cannot always replace *'a-kela* 'up to', as shown by the ungrammaticality of (24a'–b'). With *'a-kela*, what is emphasized is the progress that is made up to the point that needs to be reached, a meaning that seems to be encapsulated in the prefix *'a-* 'DIR'.

(24) Tanan Rukai
a. ***'a-kela****-nga=nako* *inia* *'o-silo.*
DIR-up.to-COS=1SG.NOM that CAUS.MVT-bead
'My bead-embroidering work stops there.'
a'. ****o-a-kela****-nga=nako* *inia* *'o-silo.*
ACT-REAL-reach-COS=1SG.NOM that CAUS.MVT-bead
b. *'a-kela-nga* ***'a-ka-inia****.*
DIR-up.to-COS DIR-ALL-that
'At that time, it will have reached (that point).'
b'. ****o-a-kela****-nga* *'a-ka-inia.*
ACT-REAL-reach-COS DIR-ALL-that

Things are a bit more complicated because of the occurrence of two other homophonous forms. One of these forms, which is also invariable, consists of a bimorphemic prefix *'a-kela-* 'up to' (< *'a-* 'DIR', *kela-* 'arrive, reach'), and encodes only a spatial meaning. Just like the bimorphemic prefix *'a-ka-*, *'a-kela-* occurs specifically with the interrogative pronoun *ino* as well the demonstratives *inia* 'here' and *idraa* 'there', as shown in (25a–b).[7]

[7] Note in passing that there is no prefix corresponding to the verb *twalay* 'come from'. This is demonstrated by the fact that (i) it cannot attract *ino* 'where?' or any demonstrative, unlike the bimorphemic prefixes *'a-ka-* 'at' or *'a-kela-* 'up to', but (ii) it attracts pronominal forms. Compare the grammaticality of (ia–d).

(i) Tanan Rukai
a. ****twalay****-(i)no* *koadra?*
come.from-where that
Intended for: 'Where does he/she come from?'
b. ***twalay*** *('a-ka-)ino* *koadra?*
come.from (DIR-ALL-)where that
'Where does he/she come from?'

(25) Tanan Rukai

a. ***'a-kela**-ino* *koadra* *daedae=so?*
DIR-reach-where that land=2SG.GEN
'How far is your land?' (Adapted from P. Li 1973: 122)

b. *'a-kela-idraa* *koadra* *daedae=li.*
DIR-up.to-there that land=1SG.GEN
'My land is that far.'

As a means of comparison, the sequence *'a-kela-ino* 'up to what point, how far?' corresponds to *'a-ka-ino* 'where?', as shown in (26).

(26) Tanan Rukai

amoa *'a-ka-ino* *koadra* *marodrang?*
go DIR-ALL-where that old.(wo)man
'Where did the old person go?'

One major distinction between the verbal *(o-a-)kela* and the prefixal forms of *'a-kela* 'up to' is that the latter never attracts pronouns (27a). (27b) shows that if the prefix *'a-kela-* 'up to' is replaced by the corresponding verb *'a-kela*, the latter can attract a pronoun and *ino* occurs as a free morpheme after the verbal predicate.

(27) Tanan Rukai

a. ****'a-kela**-ino=so* *koadra* *daedae=so?*
DIR-reach-where=2SG.NOM that land=2SG.GEN

b. ***'a-kela**(-nga)=so* *ino* *'o-silo?*
DIR-reach(-COS)=2SG.NOM where CAUS.MVT-bead
'Where does your bead-embroidering work stop?'

The other homophonous form is *'a-kela*, which is actually the causative form of the verb *(w-a-)kela* 'arrive, reach'; the prefix *'a-* should be analyzed as causative. The fact that *'a-* actually is a reflex of PAN **pa-* 'CAUS' explains why *wakela* 'arrive' is correct, but **wa'akela* (< *o-a-'a-*

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c. ****twalay**-ino=so* *koadra?*
come.from-where=2SG.NOM that
Intended for: 'Where does he/she come from?'

d. ***twalay**=so* *('a-ka-)ino?*
come.from=2SG.NOM (DIR-ALL-)where
'Where do you come from?'

kela) is not, since in most Formosan languages (except Bunun, see L. Li 2018), the causative marker *pa-* (Tanan Rukai *'a-*) attaches to a non-finite root, viz. *kela* 'arrive, reach', as in *'a-kela*.

(28) Tanan Rukai
ay-'a-kel=ako *taromak* *ki* *lalake=li*
IRR-CAUS-reach=1SG.NOM Taromak OBL child=1SG.GEN
'I shall have/get/make my child(ren) come to Taromak.'

To sum up the discussion of this subsection, I have shown that there are three related (free) forms in Tanan Rukai: *(o-a-)kela* is a verb meaning 'reach, arrive'; *'a-kela* 'up to' is also a verb (made up of a base, *kela*, to which is attached a prefix *'a-* 'DIR'). It should not be mixed up with *'a-kela*, which is the causativized form of *(o-a)kela*. A fourth form is a bimorphemic prefix which only occurs with the interrogative word *ino*, and demonstratives, e.g., *idraa* 'there'.

3.4 twalay vs. 'atwalay

P. Li (1973) does not discuss the forms *twalay* 'from' as opposed to *twalay* 'come from'. What is interesting to note is that the morpheme *twalay* 'come from' is an invariable verb that encodes both spatial and temporal relations, as shown in (29a–b).

(29) Tanan Rukai
a. ***twaladh****=ako* *taihoko.*
come.from=1SG.NOM Taipei
'I come from Taipei.'
b. ***twalay****=[a]ko* *ko* *icaili* *'o-silo.*
come.from=1SG.NOM that last.year CAUS.MVT-bead
'From last year, I have started to bead-embroider.'

The complex form *'a-twalay* 'get from' is the causative verb form of *twalay* 'come from'. It is not a prefix since it can attract pronominal forms, as in (30).

(30) Tanan Rukai
'a-twaladh*=ako* *'a-ka-inia* *m-alra.*
CAUS-come.from=1SG.NOM DIR-ALL-that SBJV-take
'I took (it) from him/her.'

It cannot attract any demonstrative pronoun (31a), and must co-occur with the sequence *'a-ka*-X that indicates the source (31b–c).

(31) Tanan Rukai

a. **amalr=aku* ***'a-twalay****-(i)nia* *ki* *dhipolo* *'a-ka-inia.*
take=1SG.NOM CAUS-come.from-that OBL Dhipolo DIR-ALL-that
'I took it from Dhipolo.'

b. *amalr=ako* *'a-twalay* *ki* *dhipolo* *'a-ka-inia.*
take=1SG.NOM CAUS-come.from OBL Dhipolo DIR-ALL-that
'I took it from Dhipolo.'

c. **amalr=ako* *'a-twalay* *ki* *dhipolo* *Ø.*
take=1SG.NOM CAUS-come.from OBL Dhipolo Ø
'I took it from Dhipolo.'

3.5 The verb 'do for'

The verb *'asi-a-kay* 'do for', with its base the adnominal pronoun *kay* 'this' (32) is not discussed in P. Li (1973) and is introduced in this section for the sake of comparison with the other Rukai dialects in §4.

(32) Tanan Rukai

a. ***'asiakay****=aku* *inia* *o-aga.*
do.for:REAL=1SG.NOM that SBJV-cook
'I cook for him/her.'

b. *o-a-aga* *'asikay/**'asiakay* *inia.*
ACT-REAL-cook do.for:SBJV/do.for:REAL that
'I cook for him/her.'

3.6 Interim summary

In this section, I have given a reassessment of morphemes that were treated as prepositions in Tanan Rukai by P. Li (1973), who provides four criteria to distinguish verbs from so-called prepositions: (1) occurrence of a determiner, (2) absence of an object NP, (3) TAM marking, (4) embedded morphological marking through the infixation of <*o*>. I have shown, however, that there are a number of problems with his analysis because the internal composition of these morphemes is not correctly analyzed and their free or bound status is not recognized. The tests

P. Li (1973) propose are not incorrect by themselves, but they are not appropriate in the present context.

I have argued that these morphemes either function as verbs, adverb or are prefixes (and more specifically verbalizers) which attach to a (pro)nominal form. I have explained in detail the word formation of each of these verbs and/or the meaning of the affixes in question. The results of these findings are summarized in Table 2:

Table 2. Verbs, adverb and affixes in Tanan Rukai: A reassessment of P. Li (1973)

Locative, directional, instrumental verbs		Gloss	Adverb	Gloss	Related affixes	Word formation
Finite forms	Non-finite/ subjunctive forms					
i-a-kay	*i-kay*	'be at, exist'	–	–	–	*i-* 'at', *a-* 'REAL' *kay* 'this'
–			*'a-ka-ino* *'a-ka-inia* *'a-ka-idraa*	where here there		*'a-ka-* 'DIR-ALL'
ara-kay		'use'	–	–	*ara-* 'use'	*kay* 'this'
o-a-kela	*kela*	–	–		–	*o-* 'ACT', *a-* 'REAL'
'a-kela$_1$		'reach, up to'	–	–	*'a-kela-* 'up to'	*'a-* 'DIR'
'a-kela$_2$		'make…reach'	–	–	–	*'a-* 'CAUS'
twalay		'come from'	–	–	–	–
'a-twalay		'get from'	–	–	–	*'a-* 'CAUS'
'asi-a-kay	*'asikay*	–	–		–	*kay* 'this'

In the next section, I briefly examine the Tanan counterparts of 'at', 'to', from', 'for' etc. examined above in the other five Rukai dialects. Because of limitations of space, illustrative examples are taken from the most representative dialects, Mantauran, Tona and Budai.

4. The morphemes 'at', 'to', 'from', 'for' in the other five Rukai dialects

I list in Table 3 all the equivalents of the locative, directional, instrumental verbs that were discussed in Tanan (see the preceding section), in Mantauran, Maga, Tona, Budai, and Labuan. We find similar forms (some having undergone sound changes) that will be discussed in more detail in §5. The affixes found in Tanan also occur in the other Rukai dialects, including *i-* 'LOC', *a-* 'REAL', *pa-* 'CAUS', *o-* 'ACT', *ara-/aha-* 'use', and the base in all the dialects is mostly *kay* 'this'.

Table 3. Locative, directional, instrumental verbs in the Rukai dialects

Gloss	Tanan	Labuan	Budai	Mantauran	Maga	Tona
'be at'	*i-a-kay*	*i-a-kay*	*i-a-kay*	*om-i-ki*	*i-kée*	*'i-a-kay*
'(come) from'	*twalay*	*twalay*	*twalay*	*'a-li-ki*	*sa-l-ké*	*si-li-kay*
'(get) from'	*pa-twalay*	*pa-twalay*	*pa-twalay*	*pa-'a-li-ki*	*pa-sal-ké*	*pa-sili-kay*
'arrive'	*o-a-kela*	*o-a-kela*	*o-a-kela*	*m-o-kela*	*u-k~~i~~la*	*o-a-kela*
'use'	*ara-kay*	*aha-kay*	*ara-kay*	*to-'ara-ki*	*s-ar-ké*	*si-a-kay*
'do for'	*'asi-a-kay*	*pasi-a-kay*	*pasi-a-kay*	*'i-ra-ki*	*ker-ké*	*ki-a-kay*

All these morphemes function as verbs. The arguments that can be advanced to validate this claim are as follows:

1. They occur in clause-initial or -medial position, as shown in (33).

(33) Mantauran Rukai

a. *lo ma-lrakase=mao m-o-valrio, ma-'adhaili,*
if STAT.SBJV-lazy/dislike=IMPRS.GEN SBJV-to-village STAT-far
***om-i-ki**=mao ooma i'olai.*
ACT-at-this=IMPRS.NOM field stay.overnight
'If we did not feel like returning to the village (because) it was far away, we (would) stay overnight.' (Zeitoun 2007: 85)

a'. *maava'i dhona'i a-sava~savare=mao **m-i-ki** latadhe.*
come that PL-RED~young.man=IMPRS.GEN SBJV-at-this outside
'Young men would come to (the girl's house) and wait outside.' (Zeitoun 2007: 86)

Tona Rukai

b. ***'i-a-kay** na 'osama si la 'ikay ko valak=ini*
at-REAL-this OBL king and then be.at NOM child=3SG.GEN
'a-baobao-nga si...
become-young.woman-COS and
'There was a king who had a grown-up daughter.'

b'. *ko titina kodray 'ocib=idra boathi m-wi*
when mother that SBJV:split.stones=3SG.GEN sweet.potato SBJV-go
*ta-dradrav-ane mota'amao=ni **'i-kay***
LOC.NMLZ-chase.bird-LOC.NMLZ SBJV:to:up=3SG.GEN at-this

ta-dradrav-ane *kwane.*
LOC.NMLZ-chase-LOC.NMLZ SBJV:eat
'Then the mother took the sweet potatoes to the place where birds are chased and stayed there to eat.'

Budai Rukai
c. ***i-a-kay*** *ku* *tama* *la* *tu-lalake* *ku* *tatulru* *ku* *muakabalubalua.*
at-REAL-this NOM father then give-birth NOM three LIG young.woman
'There was a father who had three grown-up daughters.'
c'. *(lr)i-apece* *ka* *lrulay* ***i-kay*** *ki* *ngiuku.*
IRR-sleep NOM child at-this OBL cradle
'The child is sleeping in (his/her) cradle.'

2. Most can carry TAM markers in initial position, as in (34).

(34) Tona Rukai
a. ***syalika****=iso* *'aokay?*
REAL:from=2SG.GEN come
'Where do you come from?'
b. *amoa=iso* ***pasilikay*** *kisedame* *na* *paiso?*
go=2SG.GEN from borrow OBL money
'Whom did you borrow money from?'

3. They attract clitic pronouns when they occur in initial position (but not when they occur in medial position), as in (35):

(35) Mantauran Rukai
a. *lo* *maongo-nga,* *am(o)-okela-nga=mita* *dhona* *valrio.*
if STAT.SBJV:night-COS IRR-reach-COS=1PL.INCL.NOM that village
'At night, we will reach that village.' (Zeitoun 2007: 86)
a'. *...mani* *o-dhalra-nga=mao* *m-oa* *m-okela* *o'i* *valrevalre'ae.*
...then to-up-COS=IMPRS.NOM SBJV-go SBJV-reach that road
'...then one (would) go up (again) to the road.' (Zeitoun 2007: 86)

Budai Rukai

b. ***w-a-kela*** *ka* *takanaw* *nakuane.*
ACT-REAL-arrive NOM Takanaw 1SG.OBL
'Takanaw came to me.'

b'. *sa-kai=naku* *kela-ana* *udale.*
when-NEG=1SG.GEN reach-still rain
'Before I arrived, it was (already) raining.'

With the exception of Maga, in which most verbs are invariable in affirmative clauses, some of these verbs exhibit certain alternations, commonly found in other verbs, as shown in Table 4.

Table 4. Verbal alternations

Gloss	Labuan	Budai	Mantauran	Maga	Tona
'be at'	*i-a-kay*	*i-a-kay*	*om-iki*	*ikee*	*'i-a-kay*
	i-kay	–*	*m-iki*		*'i-kay*
		i-kay	*iki*		
'(come) from'	*twalay*	*twalay*	*'a-li-ki*	*sa-l-ke*	*si-a-li-kay*
					si-li-kay
'(get) from'	*pa-twalay*	*pa-twalay*	*pa-'a-li-ki*	*pa-sa-l-ke*	*pa-si-li-kay*
'arrive'	*o-a-kela*	*o-a-kela*	*m-okela*	*u-kɨla*	*o-a-kela*
	kela	–	*m-okela*	*kɨla*	*kela*
		kela	*okela*		
'use'	*aha-kay*	*ara-kay*	*to-'ara-ki*	*s-arke*	*si-a-kay*
'do for'	*pasi-a-kay*	*pasi-a-kay*	*'i-ra-ki*	*ker-ke*	*ki-a-kay*
	pasi-kay	*pasi-kay*			

a. Budai Rukai does not exhibit any subjunctive form. In Labuan, Maga, and Tona, there might be a neutralization between the subjunctive and the non-finite forms of the verb.

More specifically, in Rukai, verbs undergo different morpho-phonological alternations depending on whether they are dynamic or stative and whether they occur as finite, non-finite or subjunctive. Finite dynamic verbs are usually marked by *o-* 'ACT', which is usually followed by the realis prefix *a-*, as in Tona/Budai/Labuan *o-a-kela* 'arrive, reach' (35a). In Mantauran, *om-iki* 'exist, be at' exhibits the same alternations as *om-alra* 'take' (36a–b) and (36c–d) (see also (35a–a')), cf. *om-~m-~Ø-*.

(36) Mantauran Rukai (Zeitoun 2007: 87)

a. *…o-lriho'o-ka=nai* ***om-iki*** *valrinae dha'ane.*
…ACT-know-NEG=1PL.EXCL.GEN DYN-exist Valrinae house
'…we did not know that there were houses in Valrinae.'

b. *mani* ***Ø-iki****=lrao dha'ane…*
then Ø-be.at=1SG.NOM house
'then I was in the house…'

c. *olo 'olrovo'o=mao dhona'i vecenge la pahai,* ***om-alra****=mao*
if SBJV:pound=IMPRS.GEN that millet and rice DYN-take=IMPRS.NOM
'avelre topo'o.
big.rounded.bamboo.dish SBJV:winnow
'When we pounded millet and rice, we (would) take a big rounded bamboo dish to winnow (the grains).'

d. *mani* ***Ø-alra****=lrao tai…*
then Ø-take=1SG.NOM taro
'then I took the taro…'

Non-finite dynamic verbs are zero-marked, with no occurrence of *o-* 'ACT' and/or *a-* 'REAL', e.g., Budai/Labuan *i-kay* 'be at', *kela* 'arrive, reach' (35b) and (37). Subjunctive dynamic verbs are generally unmarked, unless the first vowel of the root is /a/, in which case they take the prefix *o-* or the infix <*o*> as in Tona/Labuan *wakela* 'arrive (SBJV)'.

(37) Tona Rukai

a. *'i-a-kay na 'osama si la* ***'ikay*** *ko valak=ini*
at-REAL-this NOM king and then be.at NOM child=3SG.GEN
'a-baobao-nga si...
become-young.woman-COS and
'There was a king who had a grown-up daughter.'

b.* *'i-a-kay na 'osama si la* ***'i-a-kay*** *ko valak=ini*
at-REAL-this NOM king and then at-REAL-this NOM child=3SG.GEN
'a-baobao-nga si...
become-young.woman-COS and

5. Reconstruction

Table 5 shows the tentative reconstruction of the locative, directional, and instrumental verbs in Proto-Rukai, based on a comparison of the six Rukai dialects. I make two major assumptions. First, I show in Table 5 that locative, directional and instrumental verbs in the Rukai dialects are made up of the same base, PR *kai 'this'. Second, being derived from the demonstrative *kai,

all these forms are verbalized through the occurrence of a particular affix, reconstructed as follows: PR *ara- 'use' and PR *i- 'LOC'. There are a number of affixes for which I cannot pin down the meaning at this time, c'est-à-dire PR *sa- and PR *li, etc. Other affixes that are reconstructible include PAN/PR *pa- 'CAUS', PR *a- 'REAL', PR *o- 'ACT'.

Table 5. Locative, directional and instrumental verbs in the Rukai dialects

Gloss	Tanan	Labuan	Budai	Mantauran	Maga	Tona	Proto-Rukai
'be at'	*i-a-kay*	*i-a-kay*	*i-a-kay*	*om-i-ki*	*i-kée*	*i-a-kay*	*i-a-kai
'(come) from'	*twalay*	*twalay*	*twalay*	*'a-li-ki*	*sa-l-ké*	*si-a-li-kay*	*sa-li-kai
'(get) from'	*'a-twalay*	*pa-twalay*	*pa-twalay*	*pa-'a-li-ki*	*pa-sa-l-ké*	*pa-si-li-kay*	*pa-sa-li-kai
'use'	*ara-kay*	*aha-kay*	*ara-kay*	*to-'ara-ki*	*s-ar-ké*	*si-a-kay*	*ara-kai
'do for'	*'a-si-a-kay*	*pa-si-a-kay*	*pa-si-a-kay*	*'i-ra-ki*	*ker-ké*	*ki-a-kay*	*si-ara-kai

Below, I first briefly discuss sound changes before moving to the reconstructed forms.

Mantauran (Mt) and Maga (Mg) have undergone the highest number of sound changes:

1. PR *i-a- and *ai > Mt *i*, cf. *om-i-ki* (< PR *i-a-kai) and Mg *é*, cf. *ikée* (< PR *i a kai).
2. PR *s > Mt ' /ʔ/, cf. *'a-li-ki* 'come from' (< PR *sa-li-kai).
3. In Tanan (Tn), the reflex of PR *p is ' /ʔ/, cf. *'a-twalay* '(get) from' (vs. Budai/Labuan *pa-twalay*).
4. Tona (To) has lost PR *r, cf. To *syakay* 'use' (< **si-ara-kay), and in Labuan (Lb), PR *r has become *h*, cf. Lb *ahakay* 'use' (< PR *ara-kay).

The existential/locative verb (cf. PR *i-a-kai) is the easiest to reconstruct, once sound changes taken into account. The verbs *twalay* '(come) from' and *pa-twalay* '(get) from', found in Budai, Labuan, and Tanan, are treated as innovations because of the absence of the demonstrative *kai* found in all the other verb forms.

In Mantauran, Maga and Tona, we witness the addition of the prefix *to-* 'make, produce' (cf. Mt *to'araki*) and *s(i)-* 'meaning unknown' (cf. To *syakay* (< **si-ara-kai) and Mg *sarké* (< **s(i)-ar(a)kai).[8] I presume that Mantauran *'iraki* is a reflex of **si ara-kai.

At the present, though, I still cannot clearly explain the meaning or function of PR *si-, Mg/To *ki-* and Bd/Lb/Tn *pa-* in the verbs Bd/Lb *pa-si-akay*, Mg ker-ké, To *ki-a-kay*.

[8] In the negative, the ending *kai* 'this' is found, e.g., *i-sarkai* 'do/did not use' and *i-kerkai* 'do/did not do for'.

6. Conclusion

In this paper, I have shown that there actually are no prepositions in Tanan Rukai, as argued by P. Li (1973). On the other hand, there is a full series of verbs (locative, directional and instrumental) which are made up with the same base, *kay* 'this' (reconstructed as PR *kai). Interestingly enough, these verbs are made up with prefixes which can be identified and have their own usage. Tanan is peculiar in having the bimorphemic *'a-ka-* attaching only to the demonstrative *inia* 'here' and *idraa* 'there' and the interrogative pronoun *ino* 'where' and having developed as an adverb, a function not found in other Rukai dialects. I have tentatively provided a reconstruction of the paradigm of the locative, directional, and instrumental verbs in Proto-Rukai, based on a comparison of the six Rukai dialects, this being part of a larger comparative study of this language (Zeitoun in preparation).

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Abbreviations and conventions

ACT active voice
ALL allative
AV actor voice
CAUS causative
CN common noun
COS change of state
DIR directional
DAT dative
DYN dynamic
EXCL exclusive

GEN	genitive
IMP	imperative
IMPRS	impersonal pronoun
INCL	inclusive
IRR	irrealis
LIG	ligature
LOC	locative
MVT	movement
NEG	negation, negative
NFIN	non-finite form
NMLZ	nominalizer/nominalization
NOM	nominative
OBL	oblique
PL	plural
PN	personal noun
PREP	preposition
REAL	realis
RED	realis
SBJV	subjunctive
SG	singular
STAT	stative
1	first person
2	second person
3	third person
.	1) portmanteau morpheme (in grammatical gloss); 2) multiple gloss (in content word, e.g., young.woman)
:	(divisible) morpheme
-	prefix or suffix
<>	infix
=	clitic
~	reduplicated morpheme
*	1) reconstructed morpheme; 2) ungrammatical example

Abbreviations for languages include the following

Lb	Labuan
Mg	Maga

Mt Mantauran
PAN Proto-Austronesian
PR Proto-Rukai
Tn Tanan
To Tona

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客話「會」麼个
──臺灣客語「會」的情態語義及體貌意義

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本文探討臺灣客語「會（voi5/6）」的情態語義及體貌意義。客語「會（voi5/6）」的情態語義分為「動力情態─參與者內在」、「參與者外在情態」與「認識情態」三大類。臺灣客語的「動力情態─參與者內在」包括恆常能力、潛在屬性、高質能力及慣常傾向；本文指出客語「會」參與者內在的動力情態已有語義高度泛化的用法，可以無生物為主語，具有演變為認識情態的條件。參與者外在的動力情態為包括慣常意義在內的條件必然，但並無「條件可能」或根源可能義。認識情態的典型用法屬於強度較高的「認識蓋然」，此外還發展出「會+狀態動詞」和「會 V 得」這兩種主觀化程度更高、但並不具推測意義的認識情態。「會」也從認識蓋然的「未然」特性發展出體貌意義，為其他漢語方言「會」的用法中少見的「近將然體」。本文在前人基礎上以客語語料修正「會」的語義演變路徑，提出慣常傾向及潛在屬性在語法化為認識情態上的關鍵地位，並解釋「會」的能力義與情態特點之間的關係。

關鍵詞：會、客語、動力情態、認識情態、未然

1. 前言

語言學中的「情態」（modality）主要是一個語義層次的範疇，多數學者認同 Lyons（1977: 452, 878）所指出的特徵，即說話者「對句子的命題內容所抱持的觀點或態度」，其中牽涉到傳統邏輯模態研究中的可能性（possibility）或必要性（necessity）的邏輯概念。涉及情態的概念包括數種不同的語義類型，Palmer（1990[1979]）將之劃分為認識情態（epistemic modality）、道義情態（deontic modality，或稱義務情態）和動力情態（dynamic modality）三大類，是學者經常援用的分類，其他分類模式大致以這個為基礎做分合增減。例如，Palmer（1990[1979]: 37）在動力情態之下另立「中立/條件（neutral/circumstantial）」情態的次類，主要表達客觀情況下的可能性或必要性，與表能力和意志的主語取向（subject-oriented）情態相對。有些學者將認識情態之外的情態分為施事者指向（agent-oriented）情態和說話者指向（speaker-oriented）情態（Bybee 1985; Bybee et al. 1994），

或是分為「參與者內在情態」（participant-internal modality）和「參與者外在情態」（participant-external modality）（Van der Auwera & Plungian 1998）。非認識情態在傳統情態分類中有「根源情態」（root modality）的名稱，大致包括道義情態及動力情態，與認識情態相對，這是由於根源情態屬於命題內的意義。Palmer（2001[1986]）進一步將情態分為命題情態（propositional modality）和事件情態（event modality）兩大類，前者包括認識情態及示證情態（evidential modality），都屬於命題之外的成分；後者則包含道義情態和動力情態。事件情態的設立呼應傳統情態分類中的根源情態。

自然語言中經常使用同一個情態詞來表示兩種或兩種以上的情態意義，不同情態詞的多義性也往往表現出跨語言/方言的平行性。Bybee et al.（1994）便根據跨語言的語料探討情態的來源義及其歷時發展，歸納出幾種常見的演變模式，使情態研究同時具有歷時語法化演變及跨語言共性探討的意義。其中「能力（ability）＞根源可能（root possibility）＞認識可能（epistemic possibility）」的演變路徑，以及 Van der Auwera & Plungian（1998）在其基礎上建構出來的「參與者內在能力＞參與者外可能性＞認識可能」的語義地圖模式，都具有一定程度的概括力，在情態概念的研究中具有相當的影響力。

在情態詞中，「會」是現代漢語語義最豐富的多義情態詞之一。儘管情態詞的多義性及其語義演變路徑往往表現出跨語言/方言的一致性，「能願動詞」（相當於本文所稱之「情態動詞」）在對外華語教學中始終是個難點，其中「會」又是難中之難，顯示多義情態詞的語義發展在不同語言中所展現出來的「個性」也不容忽視。西方情態語義研究大量仰賴印歐語系語言的材料，未能概括漢語系語言的現象，范曉蕾（2011; 2016）已經有所討論。在漢語內部，古漢語及現代漢語有關「會」的討論相當多（參湯廷池 1976；呂叔湘 1980；劉月華等 2001；楊秀芳 2001；傅書靈、祝建軍 2004；蔣紹愚 2007；王鵬、馬貝加 2011 等），漢語方言[1]中，各大方言相當於共通語[2]「會」的形式也展現出不同的情態用法，其中閩南語有較多的研究成果（參于嗣宜 2007；黃育正 2007；許婷婷 2013；連金發 2013；郭維茹 2014 等），在南北官話、吳語、粵語、贛語中也已有跨方言的比較討論（參范曉蕾 2011；2016），顯示它們在不同的方言間具有若干差異，而南方漢語

[1] 漢語研究中「方言」一詞雖然經常與 dialect 互譯，但嚴格來說二者並不等值。「dialect」一詞通常是社會語言學中與「language」相對的概念，這種概念的「dialect」中文較接近的術語是「腔調」或「口音」。但漢語研究中所稱的「方言」則是歷史語言學譜系分類中的一個定位，也就是漢藏語系語言中漢語族的下位分支，可以分為官話、吳語、閩語、客語、粵語等不同的大方言群，個別的漢語方言則是這些大方言群的再下位分支。所有的漢語方言其實也都是不同的語言。

[2] 在本文中，「現代漢語共通語」意指具有通語（koiné）性質的官話方言，也就是一般英語文獻中所稱的 Mandarin。

方言「會」的用法普遍較為廣泛的特點也因而彰顯出來。然而在客語的研究中，「會」的表現尚未有完整的分析，以致尚無法與相關文獻有所對話。本文將致力於填補這個缺口。

古漢語、現代漢語共通語及漢語方言的討論較少提到「會」的時體用法，然而在客語「會」的先行研究中，Hashimoto（1973）和遠藤雅裕（2018）皆提到客語「會」具有「簡單將來時」（simple future）或「未然」的用法。可見未然義很可能是客語「會」有別於現代漢語共通語及漢語方言的特色之一。不過，客語「會」未然義用法文獻上探討的仍相當有限，學者對它的認識還有所不足，它的體貌用法與情態用法之間是否有所關聯，本文也將深入探討。

在客語「會」的用法中，我們將關注以下幾個議題。首先，在情態的用法上，它是否具有「根源可能義」或「參與者外在可能」的用法。「根源可能義」或「參與者外在可能」在目前的情態研究中多視為動力情態的「參與者內在能力」的語義泛化，是演變為認識可能義的樞紐（Bybee et al. 1994; Van der Auwera & Plungian 1998）。現代多數漢語方言「會」兼有能力和認識可能義，但卻未見有方言的「會」可表參與者外在可能義或根源可能義，違背了語義地圖的連續性假設（范曉蕾 2016：199–200）。范曉蕾（2016）為此提出「條件必然」作為可能義和認識可能義的中間關聯路徑。然而，劉英享（2000）和遠藤雅裕（2018）這兩份以客語為主的研究卻分別指出東勢客語和海陸客語的「會」具有根源可能義和條件可能義。那麼，是客語的「會」在情態語義的表現上展現出獨特的一面、能夠補充漢語情態演變路徑中失落的拼圖嗎？如果客語「會」與其他漢語方言同樣不具「根源可能義」或「參與者外在可能」義，它的能力義和認識情態義之間是否有其他的中間階段？其次，在體貌用法上，遠藤雅裕（2018）首先提到海陸客語「會+靜態動詞」的用法，如「這粒柑仔會酸」，並將這種用法置於「未然」義下，認為此時的「會」表示將來的變化，屬體貌意義。本文認為這種用法的「會」所表現的語義值得更深入發掘。「會+靜態動詞」是否帶有說話者主觀的判斷？若是，它與認識情態的關係為何？這種用法應當視為情態意義還是體貌意義？第三，「會」的情態用法和體貌用法之間的關係還有深入探討的空間，許多學者都注意到認識情態的「會」通常表達將來的可能性（呂叔湘 1980；朱德熙 1982；徐晶凝 2008 等），那麼，與時體有關的「未然」用法的「會」是否從情態意義發展出來？它的語法、語意特徵與演變途徑為何，也是本文將關注的。

在方法上，有別於現有關於客語「會」的考察多僅關注單一客語腔調、諮詢單一發音人或僅考察特定文本，所見或不全面，本文探討的臺灣客語範圍包括南、北四縣及海陸、東勢（大埔）客語，各腔調均有「會（*voi5/6*）」，[3] 語料來源包括個人田野調查所得及當代臺灣客語文獻，但除「會」的用法有別之處，不特別註記腔調別。文獻語料除個人自行蒐集建立者外，亦取材自中央研究院語言典藏第二期子計畫「閩客語典藏」，及行政院客家委員會委託國立政治大學團隊建置之國家型語料庫「臺灣客語語料庫（Taiwan Hakka Corpus）」。[4] 本文將以這些語料為基礎，考察臺灣客語「會」的情態及體貌意義，探討其語法、語意特點及演變歷程，並特別關注上文所指出的三個研究議題。

本文除前言外，第二節為文獻探討，三至六節分別探討客語「會」的情態語義及體貌用法，分別為「動力情態－參與者內在」、「動力情態－參與者外在」、「認識情態」與「體貌範疇」，第七節探討客語「會」情態演變的相關問題，第八節則為結論。

2. 客語「會」相關文獻探討

有關客語「會」的語義探討，目前的研究尚不多見。據 Chappell & Lamarre（2005: 109），基督新教組織巴色會於 1909 年所出版的客語語法書 *Kleine Hakka-Grammatik* 將「噲」（=會）的詞義分為「will」和「can」兩種用法。Hashimoto（1973）將客語「會」分析為 ability、possibility 和 simple future 等三種用法。這是對於「會」的用法最簡明扼要的分析。從情態的觀點來看，「能力」和「可能性」（表推測）分別對應於動力情態和認識情態，「將來時」則是由情態進一步發展出來的時體意義。

臺灣的客語研究中，劉小梅（1997）將客語「*voi*（會）」視為肯定非真實態（irrealis）的「動態詞」[5]，事實上即本文所請「情態」的語法表現形式。劉小梅（1997）認為客語「*voi*（會）」的非真實態意義可分為評估類、行為認定類與可能類。劉英享（2000）是針對臺灣東勢客語的情態詞「會」作較完整研究的文獻，該文依循 Bybee et al.（1994）的思路，將「會」分析為動力情態與認識情態（「認識可能性」）兩種，其中動力情態又分為「能力」（ability）與「根源可能性」，並指出東勢客語「會」也具有「能力＞根源可

[3] 在去聲不分陰陽的四縣及大埔讀為去聲 *voi5*，去聲區分陰陽的海陸讀為陽去 *voi6*，以下不再一一注出音讀。

[4] https://corpus.hakka.gov.tw/#/，語料出處前標示 THC 者，表示查詢自本語料庫。

[5] 劉小梅（1997）將「modality」譯為「語態」，是語意的層次，其語法表現形式「動態（mood）」則是文法的範疇。在其「動態文法體系」中討論了國、閩、客語真實態與非真實態的肯定與否定形式，稱為「動態詞」。

能性＞認識可能性」的語義演變。若果如此，客語「會」的情態義將和其他漢語方言大不相同。劉英享（2000）歸為根源可能義的例子是一些「具有能力和認識可能歧義」的例子，如「這隻雞嫲真會生卵」（劉英享 2000：52, 73）。然而，本文認為此句是否符合根源情態的界定尚有商榷餘地。本文對此將有較詳細的討論。鄭縈（2003）對臺灣國語、閩南語與客語的情態體系做簡單的共時描述和比較，其中有關客語的部分取材自劉英享（2000），該文重點在歷史比較，客語「會」的部分著墨不多。

范曉蕾（2016: 207）提出漢語方言的「會」至少有六種功能：心智能力、認識必然、條件必然、計畫性將來、高智能力與慣常傾向，這是目前為止對於「會」最細緻的語義分類[6]，並以「語義地圖模型」構擬它的情態語義演變路徑，可惜在其跨方言/語言的語料中沒有提到客語。本文擬補足這塊空缺。遠藤雅裕（2018）根據蔣紹愚（2007）對漢語歷時語法的研究以及范曉蕾（2016）針對跨語言語義地圖研究的成果，對臺灣海陸客語的「會（*voi6*）」進行了田野調查及部分文本的考察。該文將海陸客語「會」的語義大致分為「能力」、「可能性」和「未然」三項，其下再依范曉蕾（2016）的語義類別進行分類和描述，研究結果指出海陸客語「會（*voi6*）」涵蓋情態範疇以及部分體貌（或時制）範疇，其中包括了數種漢語共同語所沒有的詞義，如生理能力和條件可能。遠藤雅裕（2018）也首先討論海陸客語「會+靜態動詞」的用法，以及「會」和「有」在慣常情態用法中的可替換性，是本文討論的重要基礎之一。

3. 「會（*voi5/6*）」的「動力情態－參與者內在」

在 Palmer (2001[1986]) 對情態的分類中，動力情態屬於事件情態。動力情態最初用來指稱表達說話者或事件參與者的能力或意願，這種能力或意願是內在於事件的主語，與外在客觀條件無關，Van der Auwera & Plungian（1998）稱為「參與者內在情態」。動力情態另有一個次類是外在於事件主語的，下一節將會討論。本文將臺灣客語「會（*voi5/6*）」屬「動力情態－參與者內在」的語義分為恆常能力、潛在屬性、高質能力與慣常傾向四類。

[6] 范曉蕾（2020）據又將心智能力改為恆常能力，認識必然改為預測性將來，另新增認識或然義。雖有調整但內容差異不大，其中恆常能力為本文採用。

3.1 恆常能力

范曉蕾（2016）用「心智能力」界定「會」的能力義，指出「會」只能表心智能力而不能表生理能力，范曉蕾（2020）則將心智能力改為恆常能力，以涵蓋部分心智能力所無法解釋的用法，其說有理，本文遵循之。

3.1.1 心智能力

將動力情態區分為「心智能力」（mental ability）和生理能力（physical ability）是基於對英語「can」的了解。Bybee et al.（1994: 192）指出情態詞「can」來源於表示動作者的精神、知識上的「能力」的動詞，到 1300 年左右語義才擴大到表示體力方面等能力，也就是說，「can」的能力義具有「心智能力＞生理能力」的演變。現代漢語共通語及漢語方言「會」所表示的能力傾向於表達動作者的潛在能力、先天能力（小孩自然或經過教育到一定年齡就學會的動作），或是經過一定訓練而得到的後天能力，這些能力大多屬心智能力，其特性是具有高穩定性，一個人天生的潛在能力，或後天學習而來的技能，不容易一夕改變。臺灣客語此用法大致與共通語相當，在語法上，「會（*voi5/6*）」所表達的事態具有通指性（generic），主語則不一定具通指性。[7]「會（*voi5/6*）」表達上述的心智能力的例子如下：

（1）細湖鴨會泅會沒，佇水竇捉魚仔當慶。[徐典][8]
　　小湖鴨會游泳也會潛水，在水裡捉魚相當厲害。

（2）海外乜有客人，有兜還會講客話。[THC-認證 2018]
　　海外也有客家人，有些還會說客語。

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[7] 「通指」意謂所指涉的對象為一整個「類」（class）而非單個個體，也稱為「類指」。有關「會」的通指性與非通指性的區別，可參考蔣紹愚（2007: 5）。請注意這裡所說的是動作本身的通指性，而不是主語的通指性。

[8] 為保持閱讀的順暢性，本文例句不逐字標音、釋義，疑難字詞可參閱文末之附錄「本文客語用字對照表」。例句後均以 [ ] 註明出處。未註明出處者為筆者田野調查所得，其他語料出處之簡稱如下：徐典=徐兆泉（2009），包括四縣與海陸腔；認證=客語認證詞彙資料庫；朗讀=全國語文競賽客家語朗讀文章；教典=教育部客家語常用詞辭典。部分文獻語料之用字略有改動，儘量以教育部推薦用字為準。語料出處前標示 THC 者，表示查詢自「臺灣客語語料庫（Taiwan Hakka Corpus）」。

（3）唱歌仔乜愛學你知無？毋係逐個人開嘴就會唱。[徐典]
唱歌也是要學的你知道嗎？不是每個人開嘴就會唱歌。

客語表能力的「會」不限於人或動物，植物的潛在能力也能用「會」表達：

（4）這頭菜瓜，會打又大隻，今年當少買青菜，全靠這頭菜瓜。[徐典]
這株絲瓜，能結絲瓜、結的絲瓜又大條，今年很少去買青菜，全靠這株絲瓜。

表能力的「會」仍具動詞性，有「曉悟」義，後面可以接名詞賓語（例（5）），但並不能產。也可單獨使用，接句末助詞「咧」（例（6））：

（5）隔壁林屋歸屋人都當會水，倷仔還係泅水教練。
隔壁林家全家人都懂得水性，（林家的）兒子還是游泳教練。

（6）你會旨？-偓會咧。
你會了嗎？-我會了。

表心智能力的「會」在大多數情況下可替換為「曉（hiau3）」，包括動物的先天（例（7））、後天能力（例（8）），但是植物的潛在能力則不行（例（9））。可見「曉」仍停留在原本的「曉悟、明白」之意，尚未語法化，而「會」則有相當程度的泛化，除了原有的「知」的能力外，還表示某事態能夠實現的能力。

（7）鳥子**曉**飛時，差毋多就愛來出窠咧。
小鳥會飛的時候，差不多就要離巢了。

（8）你个貓仔**曉**撲老鼠，偓畜个毋曉。
你的貓會捉老鼠，我養的不會（捉老鼠）。

（9）*這頭菜瓜，**曉**打又大隻。
表達語義：這株絲瓜，能結絲瓜、結的絲瓜又大條。

3.1.2 僅限於否定式的生理能力

客語的「會」和共通語一樣，表達能力義時也有它的限制。據目前所知，客語的「會」不能用在限於體力方面的能力（例（10）），不能用來表達限於特定的時間、空間的能力（例（11）），也不能用來表達計量的動作（例（12）），這些限制便與心智能力的高穩定性和通指性有關。

（10）*阿賢哥當砸磳，恁重个箱仔佢乜會扛起來！
表達語義：阿賢哥很強壯，這麼重的箱子他也扛得起來！

（11）*偓今晡日寒/冷著咧，毋會泅水。
表達語義：我今天感冒了，不能游泳。

（12）佢一分鐘*會打一百五十個字。
表達語義：他一分鐘可以打一百五十個字。

這些基於心智能力高穩定性而來的限制大多可歸為生理能力，然而客語「會」是否果真不能用於表達生理能力呢？劉英享（2000: 72）指出東勢客語「會」很難區分心智能力和生理能力，遠藤雅裕（2018）則認為海陸客語的「會」可用於表達生理能力，其例如（13–16）：

（13）佢會泅一公里。[=遠藤雅裕（2018: 53），例（19）][9]
他能游一公里。

（14）a. 張三的英語會講到摎母語共樣流掠。[=遠藤雅裕（2018: 53），例（20）]
b. 阿三頭講英語做得講到摎母語平平流掠。
張三能把英語說到跟母語一樣流利。

（15）a. 張三目珠合落去也會開車。[=遠藤雅裕（2018: 53），例（21）]
b. 阿三牯眨等目也駛得車。
張三閉著眼睛也能開車。

[9] 原文附國際音標，本文從略。

（16）張三走當恬毋會定動咧。[=遠藤雅裕（2018: 53），例（22）]
張三跑得累得不能動。

以上四句是現代漢語共通語不能用「會」、[10] 而客語可以用「會」表達能力義的例子，由於一般認為現代漢語共通語的「會」表達心智能力，遠藤雅裕或以此將這四句歸為生理能力。然而仔細檢視這四個例句，事實上，根據我們的調查，例（13）似乎不是十分通順的句子，即使句子合法，語義也非常模糊。[11] 例（14a）雖然合法，但所表達的能力僅止於「講英語」，而非「講到摎母語共樣流掠」，要表達後者應使用（14b）。[12] 例（15）的「開車」表示一種技能，屬心智能力而非生理能力。例（13–16）在共通語中不能用「會」表達是由於它對於命題附加了特別的描述或條件，影響了能力義的通指性，[13] 客語表能力的「會」同樣有通指性的要求，除例（15）外也不用「會」。例（15）雖然對於「開車」附加了額外的條件「閉著眼睛」，但「開車」本身仍是一個通指性的動作，「閉著眼睛開車」也是一種後天學習而來的高級通指性技能，因此可以用「會」來表達，但它還有（17b）的表達方式，說明這項技能也受部分外在情境控制。

上述例句中只有例（16）是真正表達生理能力的。根據我們的調查，客語的確可以用「會」表達生理能力，但僅限於否定式。本文認為，區別能力義能否使用「會」的並非生理能力或心智能力，主要在於能力的穩定與否，也就是本節所稱的恆常能力。生理能力容易受時間、體力等因素影響，穩定性不高，故生理能力的肯定式大多不能用「會」，但某項能力因生理因素而消失了，有可能是恆久的、穩定的，或至少持續很長一段時間的，此時則可以用「毋會」。前文例（11）某人本會游泳、但因感冒而不能游泳屬生理能力造成的限制，是短暫的，此時即使否定式亦不能用「會」。例（17）因為年紀大而無行走能力，可以用「毋會」，例（18）因腳受傷而無法行走，此時就需視受傷程度決定是否用「毋會」。（18a）是一般的說法，表示暫時無法行走，但等腳傷好了之後便可以行走，此時若用（18b）來表達，似乎表示傷得很重，有好一段時間無法行走，若只是普通傷勢，則略有誇大的意味。

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[10] 事實上，例（15）在臺灣華語中可以用「會」表達，但以北方官話為主的普通話必須用「能」。

[11] 最接近而通順的例子是加上句末助詞「咧（*le*[24]）」：「佢會泅一公里咧」，但此句並非表能力，而是指「他快要游一公里了」。

[12] 事實上，無論是「會講英語」或是「把英語講到跟母語一樣流利」都屬於心智能力而非心理能力。

[13] 范曉蕾（2020: 96）對（14–15）在共通語中不合法的原因有更詳細的說明。

（17）佢恁大歲數，毋會行咧。
他年紀這麼大，不能走路了。

（18）a.阿明牯个腳踣著，行毋得路。
b. ?阿明牯个腳踣著，毋會行咧。
阿明的腳扭傷了，不能走路。

綜上所述，客語表能力義的「會」雖不限於心智能力義，但能否用於生理能力端看其是否指涉持久、穩定的能力，生理能力的否定式若符合此條件，便能以「毋會」來表達。因此，「恆常能力」更適合用來統攝「會」的能力義。

3.2 能力義的泛化──潛在屬性

動力情態表達主語的能力或意願，這種情態語義的主語最無標的形式應是人或動物，前節所述「會」恆常能力用法的主語包括人、動物和植物，均為有生（animate），但已可看出以植物為主語的用法已略顯出其泛化屬性。表能力的「會」若進一步擴展到以無生物（inanimate）為主語，其泛化屬性就更進一步了。臺灣客語表能力的「會」，其主語能否為非生物，學者間有不同看法。劉英享（2000）根據其東勢客語的文獻語料，指出東勢客語表能力義的「會」，其主語都是有生的，遠藤雅裕（2018: 51）則指出海陸客語表能力的「會」，其主語可以是無生的，其例如：

（19）恆星佢自家會發出光摎熱。[《新客》2：41，引自遠藤雅裕（2018），例（9）]
恆星它自己會發光也發熱。

遠藤雅裕（2018: 51）指出，此句雖不是原型的「心智能力」，但因其實現謂語所示的事件在於它內部，也是屬於能力義的一種。不過，例（19）相當符合柯理思（2007: 104）所指出的「會」的慣常標記（HABITUAL grams）用法，也符合范曉蕾（2016: 202）所定義的「條件必然」（objective necessity），亦即用在描述自然規律、社會規則或事物習性的慣常句：屬通指範疇，它報告一種從很多具體的片斷或事實中總結出來的規律，陳述泛化屬性等。表心智能力義的「會」只要求命題中的事態是通指性的，而描述自然規律的「會」，其主語也是通指的，例（19）所描述的是主語「恆星」的屬性：某物若屬於

恆星，則「自家發出光與熱」便是必然。慣常標記與能力義有關，也與曉悟義動詞有關，Kuteva et al.（2019: 249）就根據許多語言表達慣常語義的標記與 KNOW 一類動詞有關，指出 KNOW > ABILITY > HABITUAL 的語法鏈。

儘管例（10）應歸為慣常標記或條件必然、尚不足以證明表能力義的「會」可以無生物為主語，不過，在我們的語料中，確實有以無生物為主語、但仍屬能力義、無法分析為慣常標記或條件必然的例子，本文認為這是能力義的泛化，我們稱為「潛在屬性」，可以視為「會」由能力義向認識情態義轉換的橋接語境。

（20）矮凳仔會徑死人。
矮凳子能夠絆倒人。

例（20）是一句客家諺語，字面意思是矮凳子也能夠絆倒人，用以比喻不起眼的人或物也有可能成為絆腳石，故不能輕視之。此句的主語是無生物「矮凳仔」，它的主要屬性雖然並非「徑死人」，但「徑死人」這個事態的實現卻是「矮凳仔」的潛在屬性之一。例（20）與例（19）的不同在於，前者表達的是一種由事物的潛在屬性所推論出來的可能性，與能力義的關係還比較近，後者表達的則是對事物屬性的歸納性的描述，具必然性。由於「徑死人」並非「矮凳仔」的主要用途，它只表達一種可能性，而非事物的恆久屬性，不能分析為慣常標記或條件必然。就表達主語的潛在屬性而言，「會」可歸為能力義的動力情態，就其表達命題的可實現而言，也可歸為認識情態。然而例（20）尚不符合認識情態的特點，主要在於它並無「預測將來事態發生」的功能。楊秀芳（2001）探討臺灣閩南語相當於「會」、表能力義和認識情態的「解」（*e7/ue3*）時，也舉過相當類似的例子：

（21）a. 水解淹死人。【閩】[引自楊秀芳（2001: 289），例（89）]
b. 水會浸死人。【客】
水可能淹死人。

此句與「矮凳子會徑死人」幾乎平行。「水」的主要屬性並不在「淹死人」，但卻是其潛在能力之一，此句主要表達主語的潛在能力，而不在「預測」它將達成謂語所陳述的事態。楊秀芳（2001）稱此類為「表示形勢上能夠如何」，與認識情態義的「判斷形勢上將如何」（例句為「洗了紙解破去」（洗的結果紙會破掉））有所區別。事物的潛在能力屬於廣義能力義的一種，本文稱為「潛在屬性」。「潛在屬性」是恆常能力的語義泛化，表現為無生物的主語及說話者取向，對於進一步向條件必然或認識情態發展都具關鍵樞紐地位。

3.3 高質能力

客語的「會」可以表示非常擅長某項能力，相當於蔣紹愚（2007: 4）所稱的「善於」、「充分具有某項能力」的「會 2」，范曉蕾（2016）稱為「高質能力」（good-quality ability），它強調做事的質量好，屬內在能力中的強能力。表高質能力的「會」常與程度副詞連用。

客語表高質能力的「會」也可接名詞賓語，上文例（5）的「會水」也略帶高質能力義，例（22）的「會酒」表示酒量好、很能喝酒，更是明顯的高質能力。

（22）會酒毋係好事情，身體加減乜食壞淨淨。[徐典]
酒量好不是好事情，身體多少也會喝壞。

出現在高質能力「會」之前的副詞視腔調差異有「當（*dong1*）」、「真（*ziin1/zhin1*）」、「恁（*an3*）」、「還（*han2*）」、「蓋（*goi5*）」等，不再一一舉例。其中「恁+會+狀態動詞」產生一些熟語性的用法，如「恁會早」為早晨打招呼的熟語，有稱讚人能夠早起的意思；「恁會大」用於反諷則有「長到這麼大還這麼沒用」的語義，都是高質能力的延伸用法。「當會」、「恁會」、「還會」等可以單獨使用，後面不需加其他動詞，此時「會」為狀態動詞。「恁會」、「還會」在不同的語境中可能產生反諷的意味（例（25））。

（23）三伯姆當會炊發粄，炊到逐隻頂高都牖牖，當靚。[徐典]
三伯母很擅長蒸發糕，蒸的發糕每個上方都裂得剛剛好，很漂亮。

（24）老弟還會喔！逐擺考試都考第一。[教典]
弟弟很厲害喔！每次考試都考第一名。

（25）還會喔！這擺考試又打包尾！[教典]
真厲害！這次考試又最後一名！

表高質能力的「會」不限用於表達心智能力。睡覺是一種生理能力，如前文所說，生理能力穩定性低，不能用「會」，因此，如（26）所見，單純表示「能吃/吃得下」、「能睡、睡得著」的命題並不用「會」來表達。但能否容易入睡或睡得香甜則是先天的能力或屬性，穩定性較高，例（27）顯示，生理能力中的高質能力可以用「會」來表達。[14]

[14] 臺灣華語口語中的「會」也具有這種生理能力的高質能力用法，如「很會吃」、「很會睡」、「很會喝酒」等。

（26）a.*/?會食會睡就係福氣。
b. 食得睡得就係福氣。
能吃能睡就是福。

（27）這大箍牯還會睡，行到涼亭，人坐啊下定定，佢就鶻鶻袞睡落覺哩。[徐典]
這個胖子很能睡，走到涼亭，人才剛坐下而已，他就鼾聲大作睡著了。

將高質能力單獨區分開來具有語言事實的支持，客語表心智能力的「會」大多數情況可以替換為「曉」而意思不變，但表示高質能力的「會」無法替換為「曉」，或替換後語意略為改變。在跨語言的對應上，表心智能力的「會」相當於臺灣閩南語的「解（*e7*/*ue3*）」或「解曉（*e7 hiau3*）」，但表示高質能力的「會」相當於臺灣閩南語的「勢（*gau2*）」。

3.4 慣常傾向

客語「會」還可用來表示「容易發生、傾向於發生」的用法，范曉蕾（2016: 207）稱為「慣常傾向」（habitual tendency），並指出長江中下游地區漢語方言的「會」具有這種用法。慣常傾向也經常與程度副詞連用，也相當於臺灣閩南語的「勢（*gau2*）」，它應與高質能力用法高度相關。例（28）可以視為高質能力與慣常傾向的橋接語境（bridging context），「當會噭」的主語是有生的，至於是否具自主性則視「細孲仔」的年齡或成熟度而定，自主性高則可作高質能力的解讀，自主性低則偏向慣常傾向的解讀。此外，「當會噭」的含意是多層面的，它既表示哭泣的時間長、強度高（與高質能力的特點相符），也表示小孩常常哭、容易哭（與慣常傾向的特點相符），可見高質能力與慣常傾向語義有重疊之處。二者的不同之處在於高質能力的主語仍是有生物，[15] 而慣常傾向的主語則已擴展至無生物（例（29–30））或對事態的發生沒有自主權的人或生物（例（31））。[16] 此外，慣常傾向中的謂詞語義往往用來表達說話者主觀上不喜歡或不樂見的，與高質能力的正面用法不同。由高質能力到慣常傾向，是由充分具有某項能力或潛在屬性的用法泛化為表達事態高頻發生、容易發生所致。

[15] 遠藤雅裕（2018: 51）以「這幅畫實在會感動人」一句，指出高質能力用法可以無生的施動者為主語。不過此句的「會」無法以閩南語的「勢」來替代（個人語感），本文不認為此為高質能力用法，而是下文的認識情態，「這幅畫感動人」的命題能夠實現是說話者的主觀判斷，其高質能力語義或來自副詞「實在」。

[16] 例（28）與（31）的主語的語意角色不同，「噭」的主語語意角色為施事者，其自主性視主語的不同條件而有高低強弱之別，故例（28）有高質能力與慣常傾向兩種解讀。「生長薯仔」的主語則為經驗者，自始就不具自主性，故例（31）只有慣常傾向的解讀。

（28）這隻細孲仔當會嗷。
　　這個小孩子很愛哭。

（29）鐵鑊當會生鹵。[=遠藤雅裕（2018: 52），例（17）]
　　鐵鍋很容易生鏽。

（30）這下个販仔屋，當會漏水。[徐典]
　　現在市面上出售的成屋大多很容易漏水。

（31）有兜人當會生長薯仔。
　　有些人很容易長青春痘。

表慣常傾向的「會」仍然用以表達主語的潛在能力或屬性，故本文歸為表參與者內在的動力情態。不過，由於表慣常傾向的「會」已經超出表能力和意志的主語取向情態，展現出「說話者取向」情態的特點，本文認為慣常傾向用法的「會」是參與者內在情態中語法化程度較高的，已有相當程度的主觀化色彩，它是進一步語法化為參與者外在情態和認識情態的過渡用法，[17] 這一點與范曉蕾（2016）的看法不同，下文還會討論。

4. 參與者外在情態

Van der Auwera & Plungian（1998: 80–82）參照 Bybee et al.（1994）及 Palmer（2001[1986]）等人的定義，將非認識情態（non-epistemic modality）區分為「參與者內在」和「參與者外在」情態，各有可能性和必要性兩類。「參與者內在可能性」表示可能性內在於參與者的能力和意志，以客語「會」的用法而言，即上一節提到的恆常能力、高質能力等動力情態。「參與者外在情態」則相當於 Palmer（2001[1986]）所分出的動力情態的次類「中立（條件）情態」，指的是動作或事件的可能性或必要性取決於參與者以外的外在條件，也接近 Bybee et al.（1994）以「一般促成條件（general enabling conditions）」所形成的根源可能義。

[17] 柯理思（2007: 121）就指出漢語的慣常標記類似於一種認識情態標記。不過，在討論相當於客語表慣常傾向「會」的成分「愛」（如：「鐵愛生銹」）時，柯理思（2007: 113）也指出「愛」的這種用法「語法化程度低，感情色彩濃」，雖然具有主觀性，但卻「沒有認識情態形式上的特點」。可見將情態動詞表達慣常傾向的用法直接歸為認識情態仍有相當疑義。

研究漢語或漢語方言的學者對於「會」在參與者內在能力義與認識情態（可能性）之外的用法有許多不同的術語，所觀察到的語言現象也有許多不同的樣態，本文將以臺灣客語的語料一一檢視這些描述和觀察。

本節探討的參與者外在情態分為兩類，一是范曉蕾（2011: 61; 2016: 197）界定為「條件可能」[18] 的「以外在於參與者的客觀境況為促成條件，某事態具有可實現性」，一是常用在一些描述自然規律、社會規則或事物性的慣常句裡的用法，本文依范曉蕾（2016）稱為「條件必然」。

4.1 臺灣客語「會」是否具有「條件可能」義？

蔣紹愚（2007）對《朱子語類》中作為助動詞的「會」分為五種用法，其中「會 3」為「能夠做某件事」，意指「人或生物發出的某種具體動作，是非類指性的」[19]，其例子如「惟是周室人會恁地說」（只有周室人能這樣說）[20]。范曉蕾（2011; 2016）認為「會 3」相當於其所定義的「條件可能」義，也就是大致相當於參與者外在情態或根源可能義。動作的非通指性是「條件可能」義與第三節所討論的參與者內在的動力情態最大的區別所在，蔣紹愚（2007）認為「會 3」是由表能力的「會 1」（具有發出某類動作的能力）將後面的動詞由通指性的擴展為非通指性而產生的，意即本文的「恆常能力＞條件可能」。然而弔詭的是，現代漢語共通語中，「會」其實並沒有條件可能義或根源可能義，[21] 必須要用「能」、「能夠」或「可以」，或其他「V 得 R」之類的能性補語結構。以范曉蕾（2016: 200）的例句為例，「鑰匙找到了，我們*會能夠進家門了」，我們能進家門是因「鑰匙找到」這個與主語能力無關的客觀境況，是參與者外在情態，「進家門」是非通指性的事件，這類情境現代漢語及已知的漢語方言均不能使用「會」（范曉蕾 2016: 200）。就本文的觀察，客語也是如此（例（32））。

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[18] 「條件可能」在范曉蕾（2011: 61）中對應的英文術語為 root possibility，在范曉蕾（2016: 197）對應的英文則為 objective possibility，但定義是相同的。

[19] 「類指」即本文所稱「通指」。

[20] 蔣紹愚（2007: 5）詳細解釋了此例解讀為「只有周室人能這樣說」和「只有周室人會這樣說」的差異，讀者可以參看。

[21] 蔣紹愚（2007）也指出，《朱子語類》中「會 3」在現代漢語中一般不用，但他沒有解釋消失的原因。

（32）a. 鎖匙尋著咧，偓兜做得入屋咧。
b. 鎖匙尋著咧，偓兜入得屋咧。
c. 鎖匙尋著咧，偓兜*會入屋咧。
語義：鑰匙找到了，我們能/能夠/可以進家門了。

由於 Bybee et al.（1994）透過跨語言的證據主張能力義必須經過一定程度的泛化才能語法化為認識情態義，並提出「ability＞root possibility＞epistemic possibility」的語法化演變過程，學者致力於在表能力的「會」和表認識情態的「會」之間尋找根源可能義或中間過渡用法。劉英享（2000）依循這樣的思路，指出東勢客語的「會」也有具有根源可能義，他的依據是一些「具有能力和認識可能歧義」的例子：

（33）這隻雞嫲真會生卵。[劉英享（2000: 52, 73）][22]
'This hen has great ability in producing eggs.'
'It is very possible that this hen produces many eggs.'

例（33）可以是對這隻母雞某次下蛋情況的描述，「會」表能力，屬動力情態，也可以是說話者根據過去經驗，或這隻母雞的體型、食量、習性等條件，對於牠下蛋能力所作的推斷。然而，儘管例（33）的語義解讀確實有能力及推斷兩者的模糊空間，並不等同於它應歸為根源可能。事實上，「根源情態」是一個相對模糊的概念，它的設立有部分原因便是中立情態與動力情態、中立情態與道義情態之間具有模糊性 （Palmer 1990[1979]: 37），故不加以區分而用以概括認識情態以外的可能性或必要性，Bybee et al.（1994）稱為和動作者內在的能力無關的「一般促成條件」，Van der Auwera & Plungian（1998）則稱為「參與者外在情態」，相對於表能力的「參與者內在情態」。[23] 就根源可能義的這些常用界定標準而言，例（33）無論是對母雞某次下蛋能力的描述，或是根據母雞的生理條件推測其下蛋能力，這兩種情況均仍取決於母雞本身的下蛋能力，差別在於前者是主事者取向，後者則是說話者取向，但二者均非基於外界客觀情況而決定其事態能否實現，並不符合我們對「根源情態」或「參與者外在情態」的界定。

[22] 本句引自劉英享（2000），文句之釋義亦採用其英文原文。
[23] 傳統情態分類中，表能力和意願的「參與者內在」動力情態並不歸屬於情態，因此認識情態以外的可能性也常常排除參與者內在的動力情態，於是根源可能義便主要用以指稱非認識情態、且與參與者內在能力無關的參與者外在情態。

事實上，例（33）表推斷義還可以再細分為兩種情形。這隻母雞若曾經下過蛋，說話者根據其過去的經驗，認定「這隻雞嫲真會生卵」，則應歸類為 3.4 節所討論的「慣常傾向」，是動力情態的高度語法化，為認識情態的橋接語境。若這隻母雞從未下過蛋，說話者根據這隻母雞的體型、食量、習性等條件，對於牠下蛋能力作推斷，此時才是高度語法化的認識情態。根據我們的調查，在這樣的語境下，例（32）的語氣並不完足，必須加上「樣」（的樣子）或句末語氣詞 *io*[24] 才能完整表達認識情態。句末語氣詞在情態語意的表達上至關重要，卻經常被忽略。本文認為例（33）中的「會」主要仍是表達主事者（這隻雞嫲）完成句子命題（生卵）的潛在能力，句子的歧義應該分別分析為「高質能力」和「慣常傾向」，均屬參與者內在的動力情態。

遠藤雅裕 （2018: 53–54）運用范曉蕾（2016）的例句調查出客語的相應例句（例（34a）），指出客語具有條件可能義，可以填補語蔣紹愚（2007）認為現代漢語共同語沒有「會 3」的空白：

（34）a. 門鎖開了，□那隻個罪犯會逃走了。[=遠藤雅裕（2018: 53），例（23）]
b. 門閂打開咧，該隻犯人做得瀉走咧。
c. 門閂打開咧，該隻犯人瀉得走咧。
門鎖開了，那個罪犯可以逃走了。

（35）a. 門閂打開咧，阿三牯做得瀉走咧。
b. 門閂打開咧，阿三牯瀉得走咧。
門鎖開了，阿三牯可以逃走了。

根據我們的調查，儘管（34a）算是合法的句子，但它並非表示客觀情況允許所決定的「那個罪犯可以逃走」，而是表示「那個罪犯快要逃走了」，為表未然的將然義。（34b–c）是我們根據范曉蕾（2016）的普通話例句所調查出來的相應句子，說明外在於參與者的客觀境況下的可能性在客語中應該用「做得 V」或「V 得」表示。然而這兩句也有不甚通達之處，因某人若被以「罪犯」稱之，說話者必不樂見其逃走，用「做得」在語義上有些許違和。這或許是遠藤雅裕（2018）調查出（34a）的原因。此句主語若改為「恩兜」（我們）或例（35）的「阿三牯」等任何人名，都合理得多，此時說話者對於某人逃走是樂見的。

我們透過田野調查和客語文獻語料庫進行檢索，目前都沒有發現客語「會」能夠作為條件可能義的用法。條件可能在客語中的典型用法是「做得 V」或「V 得」（如例（34））。本文認為，客語「會」與現代漢語共通語一樣，不能用於非通指性的、「以外在於參與者的客觀境況為促成條件，某事態具有可實現性」的條件可能。

4.2 條件必然

蔣紹愚（2007）分析《朱子語類》中助動詞「會」，其中第四類用法「會 4」為「表示條件和結果的邏輯關係」，意指「S 具備了某種條件，就會出現 V/A 這種結果」。這種用法相當於范曉蕾（2016: 202–203）所稱的「會」類慣常句「條件必然」：常用在一些描述自然規律、社會規則或事物習性的慣常句裡的用法。「特定條件」和「必然性」為其語義要素，故其邏輯語義為：慣常地，如果存在條件 A，則必然有事態 B。具體的例子如「人會生病，神仙不會生病」、「北方的河冬天會結冰」、「小王每週一都會在辦公室」、「小王一聞到煙味，就會打噴嚏」（范曉蕾 2016：202）等。

許多學者都從不同角度描述過現代漢語或漢語方言屬條件必然用法的「會」。柯理思（2007）引述前人研究曾提到相關用法，其特色包括「用來表示重複的動作」（雅洪托夫 1958）、「說話人基於那個潛在能力而所作的一種演繹推論（deduction）」（Iljic 1985）、「歸納性的描述」（劉小梅 1997），柯理思（2007）將漢語「會」列為慣常標記之一，表示某個動作行為在過去或者現在反復出現，並沒有對將來作出預測，但「反映說話者基於觀察而作出的一種判斷」（柯理思 2007：105），並指出「會」的慣常用法是有條件的，它要求在前文或語境中對動作設定一個已然的時間框架，往往還需要表示次數的詞語（柯理思 2007：119）。「會」的慣常用法包括「每次 P 都會 Q」的慣常意義和「有時會 Q」的「偶發意義」（sporadic sense）。[24]

根據上述對「會」條件必然義的認識，臺灣客語「會」也具十分豐富的條件必然用法。以下分別舉「會」用以描述自然法則（例（36））、社會規則（例（37））、事物習性（例（38））、慣常行為（例（39）過去慣常及（40）現在慣常）和偶發意義（例（41））為例：

[24] 柯理思（2007）雖提到「會」表示自然規則的用法，但並沒有把這種用法列為慣常情態，范曉蕾（2016）的「條件必然」則同時包括自然規則和慣常用法，以「條件必然」統攝它們的相同處。

（36）豬油冷忒會結膠。
豬油冷掉後會凝成膠狀。

（37）屋稅愛照稅單規定个期限去繳，逾期無繳會罰錢哦！。[徐典]
房屋稅應該按照稅單規定的期限去繳，逾期不繳的話會罰錢哦！

（38）這{虐毛蟲/弄毛蟲}會蜒人，毋好去惹佢。[徐典]
這種毛毛蟲的毒液會灼傷人，不要去惹牠。

（39）還細該下，逐個禮拜日，偓會跈阿爹坐三輪車去天主堂。[THC-朗讀-大埔]
還小的時候，每個禮拜天我都會跟著阿公坐三輪車去天主堂。

（40）佢逐日會去公園慢走。[THC-認證 2018]
他每天（都）會去公園慢跑。

（41）有時會去挖泥團仔，斷畀平大矻…[THC-朗讀-四縣]
有時候（小孩子）會去挖泥球，把它分成大小相同的泥球…

「會」原本是一個「非現實」（irrealis）情態的標記，但在慣常用法中，「會」卻出現於過去慣常和現在慣常的句子中，亦即陳述非未然（過去或現在）的狀況，柯理思（2007: 119）認為這是由於表示慣常動作（habituals）的句子缺乏 actuality，亦即我們用 [命題 P+慣常標記] 的時候，並沒有陳述命題 P 在特定的時間和空間發生過。不過，遠藤雅裕（2018: 61）注意到，表慣常體（habitual）的句子可以使用「會」或「有」兩種標誌，我們進一步調查發現，只有「現在慣常」（例（40））可以使用「會」與「有」，「過去慣常」（例（39））則只能用「會」不能用「有」。如果慣常動作總是缺乏現實性，為什麼現在慣常可以使用「有」呢？本文認為，這或許也和條件必然和慣常傾向具有語義演變關係有關。慣常傾向是說話者根據過去或現在的經驗提出事態發生的傾向，當這個命題加上一個時間的框架，限縮其條件範圍以使事態發生成為必然，此時間框架便一定是非未然的。

例（42）是遠藤雅裕歸為生理能力的例子，本文認為應屬於條件必然。

（42）磕卵孵士哥倫布聽倒就拿起酒桌□上個的一隻個卵問大家講「□這隻卵樣般怎樣正會企站在桌□上？」[《新客》2, 82 頁=遠藤雅裕（2018: 52–53），例（18）]
哥倫布聽到就拿起酒桌上的一顆蛋問大家說：「這顆蛋如何才能站在桌子上？」

雞蛋能夠立在桌子上，並非雞蛋的內在的生理能力，而是有一定條件才能成立的。[25] 在「這隻卵樣般正會企在桌項」的問句中，說話者所問的正是「會」的條件必然用法中的條件。「會」經常與「仰般/仰仔/仰」（怎樣）、「正」（才）等共現，便是此條件必然用法的語義特徵使然。

關於條件必然究竟屬於情態分類中的哪一類，學者之間有不同的看法，柯理思（2007）認為較接近認識情態，蔡維天（2010）將「水會往低處流」一類句子歸為義務情態，范曉蕾（2016）則主張歸類為動力情態，遠藤雅裕（2018）則在「可能性」的範疇下討論此用法，歸為認識情態。本文同意條件必然具有相當程度的客觀性（動力情態的特點之一），但也同意條件必然是基於觀察而下的判斷或歸納。本文傾向將條件必然歸為非認識情態，此類命題能否實現取決於前項設定的條件（包括時間條件）是否滿足，這些條件大多是外在的，故歸為參與者外在情態。

5. 認識情態

認識情態在情態語義的分類中屬於命題外的成分，用來傳達說話者對命題的可能性或必要性所作的推測，帶有說話者的主觀判斷。「能力」和「推測」是現代漢語「會」最主要的兩種情態義，能力屬動力情態（如：他會說客語），推測則是認識情態（如：甜的東西放在桌上會引來螞蟻）。臺灣客語的「會」也具有跟共通語相同的表推測的認識情態用法，本文稱為認識蓋然（epistemic probability）。此外，本文還將探討「會」的一種主觀性用法，這種用法帶有說話者的主觀判斷，但並不帶推測成分，甚至可用於對已然情境的主觀描述。它雖非典型的認識情態，但也屬於命題外的成分，因此也屬於情態的範疇。

[25] 遠藤雅裕（2018）也注意到「一定的條件才能成立」這項要素，只是他將這項特徵視為生理能力的非通指性。

5.1 認識蓋然

情態概念可以按照強度的高低分為「可能性」及「必然性」兩個等級（Van der Auwera & Plungian 1998; Palmer 2001[1986]），認識情態也可據此分為「認識可能」與「認識必然」兩類。現代漢語「會」的認識情態義由能力義演變而來，因此過去大多將「會」的認識情態義歸為「可能」（趙元任 1980[1968]；呂叔湘 1980：245 等），也就是「認識可能」。不過，情態的強度是一個連續統，並非只有可能和必然二分，許多學者都注意到「會」所表達的推斷強度與可能性不同（Iljic 1985；Tiee 1985；彭利貞 2007；徐晶凝 2008 等），彭利貞（2007: 144）將「會」的認識情態定位於「可能」與「必然」之間的「蓋然」，表示一種極高的可能性，徐晶凝 （2008: 265）則將「會」的情態維度歸入「將然性（prediction）」，是說話人對可能事態是否成立所做出的「預言式」預測。范曉蕾（2016）認為蓋然性可歸為必然性的一種，將「會」的認識情態語義稱為「認識必然」。[26] 本文認為，現代漢語及大多數方言「會」的情態強度雖高，但以「必然性」稱之容易引起誤解，與由義務情態義演變而來的認識情態無法區辨，因此本文稱為「認識蓋然」。

臺灣客語的「會」具有與現代漢語及大多數漢語方言都具有的「認識蓋然」用法，這種「會」學者已注意到它大多用來表示將來的事件（呂叔湘 1980：245；朱德熙 1982：63；徐晶凝 2008：305 等），劉小梅（1997: 48）、彭利貞（2007: 230）、范曉蕾（2016: 196）還指出認識情態的「會」在肯定句中只能用於推測未然的事件，要推測已然事件僅僅限於疑問和否定。以下以客語舉例：

（43）a.*間房恁淨俐，阿姆頭先會拚掃過。
　　b. 間房恁淨俐，阿姆頭先怕拚掃過敢係。
　　語義：房間這麼乾淨，剛才媽媽應該打掃過吧。

（44）昨晡日係禮拜日，佢毋會去學校。
　　昨天是星期天，他不會去學校。

[26] 范曉蕾（2020: 104）著眼於此用法的的主觀推測和將來時制兩種屬性，將認識必然的「會」改稱為「預測性將來」（perdition-based future）。

（45）昨晡日佢去台北咧，仰會來偓這兜呢？
　　昨天他去台北了，怎麼會來我家呢？

「認識蓋然」的典型用法跟「條件必然」一樣，前面多帶有特定條件或前提，亦即「滿足條件 P 就會出現情況 Q」。否定的「毋會」經常與關聯副詞「正」連用，形成「正毋會 VP」，也是由於認識蓋然用法必須設定特定條件。

（46）甜个莫放桌頂，會餳蟻公。[徐典]
　　甜的東西不要放在桌上，（否則）會引來螞蟻。

（47）還當多、毋使愁，慢慢仔食正毋會哽著。[THC-朗讀 106]
　　還有很多，不必擔心，慢慢吃才不會噎到。

田中智子（2011）觀察到美濃客語的疑問詞「仰仔」雖然同時具有詢問理由和詢問方法兩種功能，但是當句中出現助動詞「愛」或「會」時，容易解釋為詢問理由，例如：

（48）你做麼个/仰仔會橫掇？[=田中智子（2011: 376），例（15f）]
　　你為什麼跌倒？（詢問理由的疑問詞疑問句）

這個現象並非美濃客語所獨有，而是臺灣客語、甚至南方漢語方言的共性。認識情態用法的「會」原本是說話者根據某種觀察到的特定情況對將來事態的發生作出推測或預測。而在詢問理由的疑問句中，說話者是就已經發生的事態，要求對話者作出原因或理由的推測，因此用「會」，也是認識情態的用法。由於「會」經常在「仰」（怎麼）類疑問句中使用，它也產生了「反詰」用法，單獨表示「怎麼會」之意，尤其在「會知」一詞中，其基本意義便是「怎麼知道」（例（49））。

（49）A：你看佢會來無？B：偓會知！
　　A：你認為他會來嗎？B：我怎麼知道！

客語否定的「毋會+VP」可以出現於另一個動詞後，組成「V 毋會 R」的可能補語，表示說話者的主觀判斷，也是一種認識蓋然的用法：

（50）你還細，無麼个力頭，削毋會靚啦！[THC-朗讀 105]
你年紀還小，力道不太夠，（甘蔗）不可能削得漂亮啦！

（51）這係電扇盡捩也吹毋會暢快个時節。[THC-越讀越懂閩客語 026]
這是電風扇怎麼吹也吹不涼爽的日子。

「削毋會靚」表示說話者對命題「（把甘蔗）削得漂亮」能否實現的主觀判斷。現代漢語共通語中沒有「V 毋會 R」的形式，臺灣閩南語有肯定和否定的「V 解/袂 R」形式，而臺灣客語則只有「V 毋會 R」而無相應的肯定式。[27]

5.2 主觀化的「會」

在發掘臺灣客語「會」的各種用法時，我們發現有些「會」的用法表示命題外的成分，帶有說話者的主觀判斷，符合我們對於「情態」的認定，不過這些用法卻不像典型的認識情態的「會」具有推測義和將然性，甚至可用於對已然情境的主觀描述，我們將之與「認識蓋然」用法區別開來，稱為「主觀化的『會』」。

5.2.1 對事態的主觀確認或肯定

遠藤雅裕（2018: 58–59）提到一種「會+靜態動詞」的用法，將之歸為體貌範疇的的「未然」用法，認為這種「會」「表示將來的變化」。例如：

（52）這粒柑仔會甜。[=遠藤雅裕（2018: 52–53），例（51）]
這個橘子（以後）會變甜。

[27] 據我們所知，臺灣詔安客語有「V 會 R」的可能式，但詔安客語不在本文的考察範圍內。

不過，我們在田調中調查「會+狀態動詞」用法時，並沒有得到「表示將來變化」的解讀。例（52）是說話者對這個橘子甜不甜的推斷，屬 5.1 節所討論的「認識蓋然」，它的將然性是「認識蓋然」用法的特性，說話者並沒有實際吃過這顆橘子。說話的語境可能是種橘子的農民或賣橘子的店主說明不同外觀的橘子如何影響甜度時，現場拿一顆橘子出來品評，表示根據剛剛的說明的某某條件，這顆橘仔應該是甜的。也就是說，「認識蓋然」用法的解讀，其語境中仍然需要帶有特定的條件或前提。若語境無所依傍，例（52）其實並不合法。

根據我們的調查，客語「會+狀態動詞」還有一種不具推測義、但表達說話者主觀態度的用法。這種用法的「會+狀態動詞」表達一種對不滿意性狀的確認或肯定，與「有+狀態動詞」表達對滿意性狀的確認或肯定形成互補。[28]

（53）a. */?這蕊花會紅。
b. 這蕊花有紅。
表達語義：這蕊花是紅的（達到可稱為「紅」的程度）。

（54）a. */?這粒柑仔會甜。
b. 這粒柑仔有甜。
表達語義：這個橘子是甜的（達到可稱為「甜」的程度）。

（55）a. 這粒柑仔會酸。
b. ?這粒柑仔有酸。
表達語義：這個橘子是酸的。（不好吃）

（56）你焗个酒會酸。
你釀的酒是酸的。

（57）a. 該間房間會細間無？
那個房間會太小間嗎？
b. 該間房間有大間無？
那個房間是否（夠）大間？

[28] 例（53–57）的調查範式是遠藤雅裕（2018: 58–59）所舉的例句，但其合法性及釋義與本文的調查結果不同，此處所呈現的為本文的調查。

（53–56）的「有」和「會」都有成句作用，去掉句子就不合法，「有」和「會」均表示對句子命題的主觀肯定和確認，但它們出現的語境呈現非常有趣的對比。花紅、橘子甜是一般情況下說話人所期待的，對這種性狀的肯定必須用「有」，不用「會」，但橘子酸、釀的酒呈現酸味是一般情況下說話人不滿意的，對這種性狀的肯定則必須用「會」而不用「有」。例（57）詢問房間對聽話者而言是否夠大，對話雙方對於房間大小都有一個期望值，詢問是否低於期望值用「會」，詢問是否達到期望值才能用「有」。這種用法的「會」與「認識蓋然」有兩個主要的差異。首先，不論是「會」還是「有」，都表示說話者對事物性狀的主觀看法，命題的真值只能主觀認定，無法以「事實性」（factuality）來判定，因此便不涉及可能性或必然性的推測。其次，這種用法的「會」並不用在「未然」的情境，而是對於已然（過去或現在）狀態的描述。

「有」的核心語義是存在，客語可以直接帶 VP，[29] 用來引出現實性事件，是一個實然（realis）情態詞。「會」則是一個典型的非實然情態詞，後面帶 VP。實然情態詞的「有」與非實然情態詞的「會」後面帶狀態動詞時，它們對於狀態的滿意或不滿意呈現功能互補的現象，是否與實然或非實然的分野有關呢？本文對此的解釋是：說話人所期待的性狀表示已達到滿足點，故用實然的情態標記，說話人所不樂見的性狀表示尚未達到滿足點，故用非實然的情態標記來表達。然而「這粒柑仔會酸」畢竟是對已然狀態的描述，為什麼使用非實然的情態詞呢？本文認為這應是由「毋會」或疑問句的「會…無」類推而來的結果。例（53–56）可用於疑問、否定與肯定句，而例（57）則只能用於疑問與否定，顯示這類句式用於肯定句有較大的限制。[30]「會」的「認識蓋然」情態具有將然性質，描述已然事件僅限於疑問和否定，而「會」這種表達說話者對不滿意性狀的主觀肯定用法由具將然性質的認識情態演變而來，最初只用於疑問和否定，但在這種後加狀態動詞的語境、表示對性狀主觀肯定的用法中，率先發展出肯定式。

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[29] 據范曉蕾（2020: 195），東南方言如粵語、閩語、客語、贛語、湘語和南部吳語的「有」都可直接帶 VP。何耿鏞（1993: 75）與項夢冰（1997: 319–320）也指出「有+VP」的用法。閩南語的討論尤其多，參 Yue-Hashimoto（1993）、曹逢甫、鄭縈（1995）、施其生（1996）、劉小梅（1997）、曹逢甫（1998）等。對於這種「有」的性質，雖然不一定指出「情態」的術語，但就其描述的功能大致不出情態的範疇。Yue-Hashimoto（1993）稱之為「affirmative aspect（確定體）」，范曉蕾（2020: 195）則認為這種帶 VP 的「有」融合了情態（肯定、確認義）、時制（非將來、現實性）與體貌（存在體）三個範疇。

[30] 情態詞的否定和疑問往往有演變不行平行的現象。

「會+狀態動詞」對於狀態的滿意或不滿意與「有+狀態動詞」呈現出功能互補，但二者都表示對性狀的主觀肯定。有趣的是，當狀態動詞為「像」時，若「像」的對象帶貶義，仍只能用「會」（例（58）），但單純描述主觀的「相像」並不涉及對性狀的滿意與否，此時「會」與「有」的功能並非互補，反而呈現平行可替換的現象（例（59））。

（58）a. 佢會像人个孫仔樣。[田調-海陸]
b. *佢有像人个孫仔樣。
他像龜孫子一樣，卑躬屈膝。

（59）a. 佢會像厥爸。[田調-海陸]
b. 佢有像厥爸。
他跟他的爸爸長得像。

「會+狀態動詞」的用法帶有強列的主觀性，與「認識蓋然」相比，二者雖然都屬於認識情態，但前者的語法化程度顯得更高。「認識蓋然」義由條件必然演變而來，前面多帶有特定條件或前提，在條件或前提滿足的情況下，該事態實現的可能性很高，仍具有部分客觀性，在謂詞的語義特徵上，「會」所帶的謂語可以是有自主性的動作動詞。而「會+狀態動詞」則是靜態的、非自主的。語法化常見的模式是，與靜態意義、非自主的謂詞結合時，它所表示的語法意義更接近情態範疇，或帶有一定的感情色彩，或者表示說話者對命題的真假判斷（柯理思 2003：28）。「會+狀態動詞」表示對事態主觀確認或肯定的語法化程度更高，就是由謂詞的語義特徵所引起的，此外，這個用法也表現出語法化常見的「主觀化」（subjectification）特徵。

5.2.2 表主觀肯定的「會 V 得仔」

南四縣以外的客語有一種表主觀肯定的「會 V 得仔」，[31] 也是一種認識情態，表達說話者的主觀觀點或態度，如「會做得仔」表示蠻好的、蠻不錯的，「會看得」即蠻好看，「會食得」即蠻好食。但此用法並非推測，不具將然性，如例（60）句用於描述非將來的特定事件，例（61）用於描述具通指性的對象，說話者對於他曾有真實體驗的某類事物提出主觀的觀點或態度，而非對於未體驗事物作出推測。

[31] 海陸客語此種用法的「會」變讀為升調「*voi35*」。又，此用法以海陸最為普遍，北四縣雖有使用，但也有語者表示從未聽過或很少使用。

（60）今晡日這席面會做得仔，係請麼人來煮个？[徐典]
今天這酒席蠻不錯的，是請誰來煮的？

（61）奶茶，奶毋像奶，茶毋像茶，略略仔甜，還會食得仔。[徐典]
奶茶，奶不像奶，茶不像茶，有一點點甜，還蠻好喝的。

本文認為，這種認識情態與「會」是從高質能力「主觀化」（subjectification）而來的。

6. 「會」的體貌用法——近將然體

Hashimoto（1973）對客語「會」的描述有「簡單將來時」（simple future）的用法。遠藤雅裕（2018）將這類時體用法的「會」歸為「未然」，表示將來要發生某種事件。遠藤雅裕（2018）的未然包括兩類用法，一類是單獨使用表達事件將要發生，可以用於描寫已經發生的過去時事件，因此不屬於時制範疇而屬體貌範疇。另一類則是范曉蕾（2016）所稱的「計畫性將來」（schedule-based future），表示事態依據計畫安排在特定的將來時間裡是確定要執行的。以下先各舉一例：

（62）【未然-表事件將要發生】
較注意兜仔，該斧頭柄啊，強強會敨下來咧。[=遠藤雅裕（2018: 57），例（44）]
小心點兒，斧頭柄快掉下來了。

（63）【計畫性將來】[32]
經理拜二（會）來上班。[=遠藤雅裕（2018: 56），例（39）]
經理禮拜二（{會/要}）來上班。

例（62–63）分別代表海陸客語「會」的「未然」義與「計畫性將來」義，「會」後面接動詞組。臺灣各腔調客語的「會」也都具有這兩種用法，不過，深入田調可以發現，計畫性將來

[32] 一位匿名審查人提出此句的「會」是否能分析為「慣常情態」的疑問。事實上，此句只能用來描述在最近即將到來的星期二經理將會來上班，並不意味經理每個星期二都來上班，或者至少是歧義的，但以前者為最無標（unmarked）的解讀，故例（63）至少有一個語義無法分析為「每次 P 都會 Q」的慣常情態。

的「會」在客語中並不發達，發音人感覺這些用法有點勉強，傾向使用其他形式或作其他解讀。[33] 客語表計畫性將來的「會」可能是受華語影響的新興用法，本文不討論這種用法。[34]

本節將探討臺灣客語「會」由情態語義發展而來的與體貌有關的用法，亦即前述例（54）的「未然–表事件將要發生」的「會」，這種用法已經屬於體貌（aspect）範疇，[35] 不過它的產生應與認識情態高度相關。「未然–表事件將要發生」用法的「即將、將要、快要」的語義十分明顯，本文將這種用法稱為「近將然體」。以下再舉一例：

（64）上禮拜割著个傷口，會㞗皮{吔/咧}，當{癢/痃}。[認證 2018]
上禮拜割到的傷口快要脫皮了，非常癢。

「近將然體」與「認識蓋然」情態在語法和語義上均有明顯的差異。在語法上，「近將然體」可以與相當於共通語「了 2」的「吔」（*e11*）[四]/「咧」（*le2*/*le1*）[海/東]共現，但認識蓋然不行。如：

（65）【認識蓋然】
你著恁少，會{寒/冷}著（*咧）。
表達語意：你穿這麼少，會感冒的。

例（65）一旦加了「吔/咧」就無法解讀為認識蓋然義，只能解讀為「快要感冒了」的近將然體，語法上雖不能說不合法，但語意相當彆扭。由於「吔/咧」傳達了變化義，可見認識蓋然的「會」具有某種靜態性質而與之互斥，[36] 而近將然體的「會」則帶有動態性質。在語義上，認識蓋然作為認識情態的一種，「推測」是其語義的核心，近將然體則不

[33] 發音人對這類句式的其中一種解讀近似 5.2.1 節所討論的「對事態的主觀確認或肯定」，本文認為這種「會+VP」也是認識蓋然情態，但已進一步主觀化，推測義減弱而肯定、未然義突出，可視為「會+狀態動詞」與認識蓋然的中間階段。

[34] 范曉蕾（2016: 205）指出很多南方方言（如武夷山話、重慶話、廣州話）表達條件必然句時強制使用助動詞，表達計畫性將來用法時則相對排斥它們。臺灣客家話也屬於這種類型的漢語方言。

[35] 本文對於體貌的認定不限於動後附加成分，而是像 Bybee et al.（1994: 2）一樣所定義的語法語素（gram），因此可以包括「會」這樣由情態動詞語法化而來的成分。至於情態和體貌的語義區別可以 Palmer（2001[1986]: 1）對於情態與時、體的不同來說明，即情態不指事件的具體特徵，而是指命題的狀態。換言之，時、體指事件在時間進程中的具體特徵，而「時」用於絕對時制的表達，「體」則用於相對時制。

[36] 范曉蕾（2020: 201）也以共通語認識情態的「會」排斥「了 2」而傾向搭配句末助詞「的」來說明「會」含有靜態性。

一定用於主觀的推測，也經常用於客觀的報導。例如捷運或火車站上的廣播「南港站會到咧」，用以告知旅客即將到達的站名，就是屬於客觀陳述，不含推測成分，這類用法不能分析為認識情態。此外，認識蓋然的語境中需要帶有特定的條件或前提，以此條件或前提作出可能性的推測，但在近將然體用法中，不需要提供判斷事態將要發生的條件或前提，它也可以是單純的描述具體時間即將到來。如「會過年咧」（快要過年了）、「月底會到咧」（月底快到了）等。

（66）會過年{吔/咧}，若屋下甜粄{蒸/炊}好言？
快要過年了，你家裡的年糕蒸好了嗎？

「過年」是一個具體的客觀時間，雖然距離多久算是「快要、將近」可以有個人的主觀認定，但是過年的到來並不是一個需要特定條件或前提來「推測」的事件。

遠藤雅裕（2018）已指出「會」的未然用法不屬於時制範疇而是體貌範疇，這是由於「會」所表達的未然是相對的而不是絕對的，它可用於表示過去即將發生的事件。如：

（67）{該央時/該當時}就會落雨咧，偓就趕遽{同/摎}衫褲收起來。
當時快要下雨了，我就趕緊把衣服收起來。

「會」的「近將然體」用法與「認識蓋然」應有密切關係。認識蓋然在前項 P 成立的前提下，表達一種對未然事態幾近肯定的預測，例（68）可以視為二者的橋接語境，「烏天暗地」類似前項 P，「像會」帶有推測成分，似乎可以分析為認識情態，但「烏天暗地」之於「落雨」也具時間上的緊密承接關係，此句分析為近將然體更為適切：「烏天暗地」是對當下天時的描述，不是設定的條件，推測成分是由「像……樣仔」承擔的，「會」用於表示事件將要發生。肯定式的認識蓋然同時具有「推測」和「未然」的語義成分，在前項 P 不出現的情況下，表示未然事態的語意突顯出來，便成為近將然體。

（68）烏天暗地，像會落雨樣仔。[認證 2018]
天昏地暗的，好像快要下雨的樣子。

近將然體的「會」後面也可以接表示數量的名詞組，顯示「會」在語法化過程中，「降類（decategorization）」的現象並沒有十分徹底。

（69）厥爸會八十歲了。
他父親快要八十歲了。

（70）大約會一百儕來這參加。[徐典]
大約（有）將近一百人來參加。

在跨語言的對比上，客語近將然體的「會」在漢語方言中顯得較為特殊，范曉蕾（2016; 2020）都沒有提到「會」的近將然用法。近將然體在臺灣閩南語中也不是以「解（*e7*/*ue7*）」來承擔，例（62）、（64）及（66–67）在臺灣閩南語中都是以由意願義語法化而來的「欲（*beh7*）」來表達，鄭縈（2003: 115） 指出「欲」演變為未來義的過程是「想要→預斷→將要」，其中的「預斷」即為認識情態義，可見不論能力義或意願義，其演變為近將然體都是以認識情態為中間橋樑。事實上，臺灣客語也可以使用相當於共通語「要」、閩南語「欲（*beh7*）」的「愛（*oi5*）」來表示近將然體。劉英享（2000）對東勢客語「愛」的研究中已有提及，其他腔調也有相同現象。

（71）a. 偓昨晡暗，差毋多愛天光了正轉。[THC-海陸客語兩句半話]
b. 偓昨晡暗，差毋多**會**天光了正轉。
我昨天晚上差不多快天亮了才回家。

（72）a. 日頭愛落山哩，轉夜个屋簷鳥，在屋頂嘰嘰喳喳。[THC-部編版教材-四縣]
b. 日頭**會**落山哩，轉夜个屋簷鳥，在屋頂嘰嘰喳喳。
太陽即將下山了，夜歸的麻雀，在屋頂上嘰嘰喳喳。

我們在客語語料庫中可以發現許多「愛」與「會」均用於近將然體，前後語境幾乎沒有什麼差別。實際田調時，除東勢客語較傾向用「愛」之外，多數發音人更傾向於用「會」。

7. 「會」情態語義演變相關問題

范曉蕾（2016）運用「語義地圖模型」為理論工具，通過跨漢語方言／跨語言的比較，構擬「會」的情態語義演變路徑，范曉蕾（2020）再加以微調，其結果如下圖：

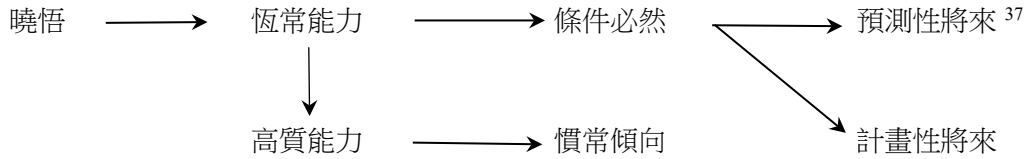

圖 1. 漢語「會」的情態義演變路徑（范曉蕾 2020：130）

范曉蕾（2016; 2020）考察了漢語方言中的南北官話、吳語、粵語、贛語和閩語，很可惜其中並無客語。遠藤雅裕（2018）補充了臺灣海陸客語的語料。那麼，本文對臺灣客語「會」語義的考察，是否能夠對漢語「會」的情態演變路徑提供什麼樣思考呢？以下在深入探討臺灣客語「會」的情態語義和體貌語義的基礎上，提供幾點與圖 1 不同的觀察。

一、「恆常能力→高質能力→慣常傾向→認識蓋然」

語義地圖理論中有一個核心的假設是「語義地圖的連續性假設」（Semantic Map Connectivity Hypothesis），在這個假設之下，「高質能力」與「慣常傾向」這兩個義項被排除在能力義演變為認識情態的中間階段，這是由於有些方言的高質能力與慣常傾向使用不同的詞形來表達，而無能力義及認識情態義（例如臺灣閩南語的「勢」），在語義地圖中切出了不連續的區域。然而，我們在臺灣客語「會」的語料中，卻能清楚地見到慣常傾向與認識情態的遞嬗痕跡，以它作為能力義與認識情態義的中間階段似乎合理得多。「恆常能力→高質能力→慣常傾向」的演變中，主語由有生物擴展至無生物（主控權降低）、主語取向轉變為說話者取向（主觀化提升）是有跡可循的，這些主語所描述的都是它們的潛在能力或潛在屬性。慣常傾向根據過去經驗或事物的潛在屬性，以說話者取向描述主語所涉及的事態高頻發生、容易發生，本身原不帶預測成分，但已有相當的主觀化。在這些過去經驗的基礎上預測將來事態的發展，便是具有將然性的認識情態「認識蓋然」。

37 預測性將來在范曉蕾（2016）稱為「認識必然」，即本文的「認識蓋然」。范曉蕾（2020）在預測性將來後另新增一條「認識或然」，此用法主要關注「會」認識情態義的否定與疑問用法，不在本文討論範圍之內。

二、「恆常能力」與「條件必然」並非一步到位

「會」的情態語義演變有一項困擾學界的問題，那便是能力義能不能直接衍生出認識情態義？由於能力義是動力情態中內在於參與者的情態，屬事件情態，為命題內成分，語法化程度並不高，而認識情態是命題外成分，屬命題情態，主觀化及語法化程度都很高，Bybee et al.（1994）便主張動力情態必須經過一定程度的語義泛化才能演變為認識情態，他們提出的演變路徑是「能力>根源可能性>認識可能性」。不過，漢語「會」事實上並沒有外在於參與者的根源可能性，本文所分析的客語「會」也沒有發現根源可能性的語義，「能力」與「認識情態」之間究竟是一步到位，還是經過尚未發掘的中間階段（能力→？→認識情態）便頗費思量。范曉蕾（2016）在發掘「條件必然」的基礎上，主張「條件必然」是能力義到認識情態義的中間階段。上圖「恆常能力→條件必然→預測性將來」便呈現這項語義演變路徑的特色。

本文對於恆常能力與條件必然之間是否一步到位仍有疑慮，主要在於「會」在這兩種語義中所出現的句法條件有很大的不同，目前仍無確切可靠的橋接語境。范曉蕾（2016; 2020）所舉恆常能力義「會」的主語均為有生物，條件必然的「會」則大量出現無生物主語。此外，在圖 1 中，條件必然是認識情態（即「預測性將來」）唯一的直接來源，但條件必然是「會」的用法中專一化最低的，它在許多方言中可以省略或使用其他形式（例如客語中現在慣常也可以用「有」）。但認識情態的「會」在漢語中廣泛存在且用法多元，似乎不應以條件必然為唯一的直接來源。本文認為，能力義中主語已泛化至無生物的「慣常傾向」和「潛在屬性」均為恆常能力與條件必然的中間階段。

范曉蕾（2016）中的條件必然事實上包括兩類，一類是描述自然法則、社會規則等，其主語和所描述的事態都是通指性的，一類則是柯理思（2007）所稱的慣常用法，反映說話者基於觀察而作出的一種判斷，它要求在前文或語境中對動作設定一個已然的時間框架（柯理思 2007：119）。「潛在屬性」的句法和語意條件較近自然法則、社會規則等「說話人基於那種潛在能力所作的一種演繹推論」（Iljic 1985），而「慣常傾向」根據過去經驗的觀察而陳述事態高頻發生，以此為基礎設定時間框架來表達條件必然當中的過去慣常或現在慣常，此時間框架是「已然」也就合情合理。

三、能力義發展為認識情態義的可能性不需完全排除

本文對客語「會」的情態分類中，「動力情態──參與者內在」包括恆常能力、高質能力、慣常傾向和潛在屬性，「動力情態──參與者外在」只有條件可能。我們同意 Bybee et al.

（1994）所主張的動力情態必須經過一定程度的語義泛化才能演變為認識情態，但所謂的語義泛化不一定指「參與者外在」，慣常傾向與潛在屬性也是高度語義泛化的用法，表現為無生物主語、不可操控的事態與說話者取向等。因此，慣常傾向與潛在屬性等動力情態也可能直接演變為認識情態。以潛在屬性為例，「矮凳子會徑死人」一句，「徑死人」雖然並非「矮凳子」的主要屬性，卻是其潛在屬性之一，「矮凳子」具有此潛在能力，故「徑死人」具有可能性，並非必然性，也不帶對將來的「預測」。就主語的潛在屬性而言，屬能力義的動力情態，就事態的可實現而言，則是認識情態。由此可見能力義與認識情態可以以「潛在屬性」為中間橋樑。

除了上述對於「會」語義演變路徑的差異外，本文還根據客語的語言事實，發掘了幾種目前對於「會」的語義較少討論到的用法，包括認識情態中不具「推測」義的兩種主觀用法：對事態主觀確認或肯定的「會+狀態動詞」與表主觀肯定的「會 V 得仔」，以及已經進入體貌範疇的「近將然體」。不具推測義的主觀用法是認識情態的進一步主觀化，「近將然體」則與認識情態用法時的將然性質有關。

綜合以上說明，本文對客語「會」情態語義及時體意義的演變路徑分析如圖 2 所示。

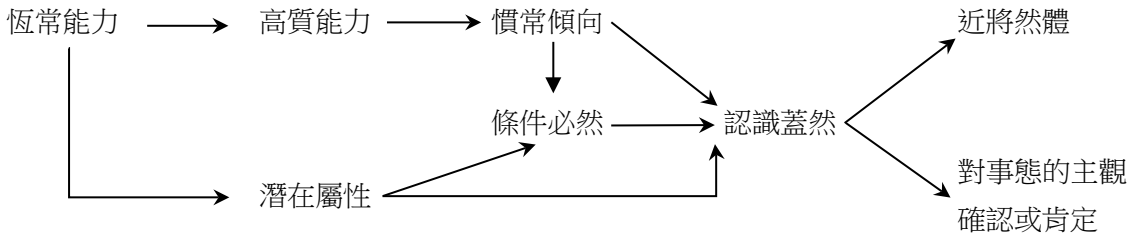

圖 2. 客語「會」的語義演變路徑

8. 結論

本文探討臺灣客語「會（*voi5/6*）」的情態語義及體貌意義，將客語的情態語義分為「動力情態──參與者內在」、「動力情態──參與者外在」與「認識情態」三大類，體貌意義則為其他漢語方言「會」的用法中少見的「近將然體」。臺灣客語的「動力情態──參與者內在」包括恆常能力（含心智能力與有限的生理能力）、潛在屬性、高質能力及慣常傾向。決定能力義能否使用「會」的並不在心智與生理之別，而是能力的穩定與否，故合稱為恆常能力。高穩定能力的語義泛化，主語施事性降低，在潛在屬性和慣常傾向的用

法中達到動力情態的高峰，並進一步向參與者外在情態與認識情態發展。客語的參與者外在情態為包括慣常意義在內的條件必然，但並無條件可能或根源可能義。本文對於「會」的參與者內在的動力情態用法作了較前人細緻的分析，提出參與者內在情態中已有語義相當泛化的用法，具有演變為認識情態的條件。「動力情態──參與者外在」稱為「條件必然」，常用在一些描述自然規律、社會規則或事物習性的慣常句裡，也用在表示某個動作行為在過去或者現在反復出現，反映說話者基於觀察而作出的一種判斷，與「慣常範疇」（HABITUAL）關係十分密切。

客語「會」認識情態的典型用法可以稱為認識蓋然，具將然性，其用法與現代漢語共通語及許多漢語方言相同，在肯定句中只能用於對未然的預測。認識蓋然在客語中還發展出一種主觀性更高的用法，在「會＋狀態動詞」語境中表示對不滿意性狀的主觀確認或肯定，與「有＋狀態動詞」表示對滿意性狀的確認或肯定形成互補。南四縣以外的客語還有一種「會 V 得」的用法，表達說話者的主觀觀點或態度，也屬認識情態的一種。「會+狀態動詞」與「會 V 得」不像典型的認識情態「會」具有推測義和將然性，甚至可用於對已然情境的主觀描述，是一種語法化和主觀化程度更高的用法。

「會」也發展出體貌意義。「近將然體」與認識蓋然關係密切，但認識蓋然排斥相當於「了 2」的句末成分，而近將然體則傾向與之搭配。認識蓋然同時具有「推測」及「未然」兩項要素，近將然體在用以推測的前項條件隱而未顯時，表示未然事態的語意突顯出來，成為只帶將然義而不帶推測義的用法，進入體貌的範疇。

本文在前人基礎上以客語語料修正「會」的語義演變路徑，提出慣常傾向及潛在屬性由能力義語法化為認識情態上的關鍵地位，並解釋能力義與「會」的情態特點之間的關係。透過本文對「會」用法的爬梳整理，我們也發現了尚待深入挖掘的研究課題，例如，在「會」的現在慣常用法和「會+狀態動詞」表示主觀確認和肯定的用法中，可以見到客語「會」和「有」具有特殊的平行或互補關係。客語「有」的情態和體貌意義，以及它與「會」的平行或互補關係是如何形成，都有待未來結合跨方言/語言的比較進行深入研究。

謝辭

本文為國科會計畫「臺灣客語的情態系統研究」（MOST 111-2410-H-001-018-）的研究成果之一，部分內容曾於「2021 年全球客家研究聯盟國際雙年學術研討會──客家研究的比較視野：回顧與展望（Biennial International Conference of GHAS 2021─Comparative Hakka Studies: Retrospect and Prospect）」上宣讀。本文寫作期間，承蒙胡伶憶、范里、徐汎平、楊世玲、蒲有任、鄭玉華、盧士盟、謝杰雄等母語人士提供語料諮詢，特此深致謝忱；投稿後亦承蒙匿名審查人的建議和指正，獲益良多。當然，本文如有任何思慮不周之處，責在作者。

〈附錄〉本文客語用字對照表（依筆劃順序排列）

客語用字	讀音/四縣/海陸	釋義
乜	me5	也
力頭	lit8 theu2	力道、氣力
个	ke5/kai5	結構助詞，相當於「的」
今晡日	kim1 pu1 ŋit7	今天
天光	thien1 koŋ1	天亮
毋	m2	否定詞，相當於「不」
毋使	m2 si3	不用
毋係	m2 he5	不是
水竇	sui3 teu5/ʃui teu5	水中
出竇	tshut7 teu5/tʃhut7 teu5	離開巢穴
包尾	pau1 mi1/pau1 mui1	最後、殿後
平大	phiaŋ2 thai6	一樣大、大小相同
平平	phiŋ2 phiŋ2	都是、一樣
打	ta3	植物結果實
正	tsaŋ5/tʃaŋ5	才
生鹵	saŋ1 lu1	長鐵鏽
目珠	muk7 tsu1/muk7 tʃu1	眼睛

續上表

仰	ioŋ3	怎麼
企	khi1	站、站立
共樣	khiuŋ6 ioŋ6/khiuŋ6 ʒoŋ6	相同、一樣
旨	maŋ2	否定副詞，置於句末表疑問，相當於「了嗎」
合落去	hap8 lok8 hi5	閉上、閤上（眼睛）
有兜	iu1 teu1/ʒiu1 teu1	有些
自家	tshit7 ka1	自己
佇	ti5	介詞，相當於「在」
佢	ki2	人稱代詞，相當於「他」
冷忒	laŋ1 thet7	冷掉
沒	mut8	潛水、沉入水裡
定定	thin6 thin6	而已
定動	thin1 thuŋ1	移動，事物改變原來位置或脫離靜止狀態
延	ien2/ʒan2	昆蟲毒液灼傷
怕	pha5	應該
泅	tshiu2	游泳
炊	tshoi1/tʃhoi1	蒸（煮）
畀	（四縣）pi3	「分佢」的合音詞，相當於「給他」
矻	khit8、khut8	堅固紮實的塊狀物
長薯仔	tsoŋ3 su2 e3/tʃoŋ5 ʃiu2 er2	青春痘
阿姆	a1 me1/a6 me1	母親
咧	le1	句末助詞，相當於「了」
屋簷鳥	vuk7 iam2 tiau1 / vuk7 ʒam2 tiau1	麻雀
昨晡暗	tsho1 pu1 am5	昨天晚上
柑仔	kam1 e3/kam1 er1	橘仔

續上表

流掠	liu2 liak8	言語流利、動作俐落
虐毛蟲/弄毛蟲	（四縣）ŋiok7 mo1 tshuŋ2 （海陸）nuŋ5 mo1 tshuŋ2	毛毛蟲
食	sɨt8/ʃɨt8	吃、喝
俵仔	lai5 e3/lai5 er1	兒子
徑	kaŋ5	行動時，被東西阻擋或絆倒
恁	an3	副詞，相當於「這麼」
時節	sɨ2 tsiet7/ʃi2 tsiet7	時候
砸磳	tsap7 tsen5	強壯、健壯
做得	tso5 tet7	可以
做麼个/仰仔	tso5 ma3 ke5/tso5 ma3 kai5 （四縣）ŋioŋ3 e3	為什麼
兜仔	（四縣）teu1 e3	一些、一點
強強	khioŋ2 khioŋ2	差一點、快要
悿	thiam3	累、疲憊
捩	lit7	使勁旋轉物體
淨俐	tshiaŋ6 li6	乾淨、清潔
淨淨	tshiaŋ6 tshiaŋ6	光光、一點也不剩
焗	khiuk7	蒸製（酒）
略略仔	liok8 liok8 e3/liok8 liok8 er1	一點點、稍微
販仔屋	fan5 e3 vuk7/fan5 er1 vuk7	建築工程完成後並取得使用執照，但在三年內並未轉手買賣的房屋。
逐	tak7	每一
逐擺	tak7 pai3	每一次
這兜	ia3 teu1/lia3 teu1	這裡
敲	lut7	脫落
敲皮	lut7 phi2	脫皮
厥	kia1	他的

續上表

厥爸	kia1 pa1	他的父親
寒著/冷著	hon2 to3/laŋ1 to3	感冒
敢係	kam3 he5	反詰的語氣詞，即難不成的意思。
無	mo2	否定副詞，置於句末表疑問，相當於「嗎」
發粄	fat7 pan3	發糕
跈	then2	跟著、跟隨
間房	kien1 foŋ2	房間
當	toŋ1	副詞，相當於「很」
該	ke5/kai1	指示代名詞，相當於「那」
膈膈	pit7 pit7	物體表面有刮傷或裂痕
摎	lau1	連詞，相當於「和」
歌仔	ko1 e3/ko1 er1	歌
麼人	ma3 ŋin2	誰、什麼人
慶	khiaŋ5	能幹、厲害
樣般	ŋioŋ3 pan1	怎樣、如何
踣	poi3	扭到
靚	tsiaŋ1	漂亮、美麗
儕	sa2	人、計算人的單位
噭	kieu5/kiau5	哭
橫捯	（四縣）vaŋ5 to3	跌倒，直立的物體倒下去
餳	siaŋ2/sia2	招致、吸引
斷	ton3	截斷
歸	kui1	全部
瀉走	sia5 tseu3	逃跑、逃走
轉夜	tson3 ia6/tʃon3 ʒa6	傍晚回家、日落而息
齁齁袞	ho5 ho5 kun3	狀聲詞，形容打呼的聲音
偓兜	ŋai2 teu1	我們

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The modality and the aspectuality of the modal verb *voi 5/6* 會 in Taiwan Hakka

This essay discusses the modality and the aspect meanings of the modal verb *voi5/6* 會 in Taiwan Hakka. The modality of Hakka *voi5/6* 會 can be divided into three categories: *dynamic modality-participant internals*, *participant-external modality*, and *epistemic modality*. (1) *Dynamic modality-participant internals* includes mental ability and limited physical ability, good-quality ability, and habitual tendency. (2) The *participant-external modality* is the objective necessity that contains HABITUAL grams but not the objective possibility nor the root possibility. (3) *Epistemic modality* indicates a stronger judgment called epistemic probability. *Voi5/6* 會 has also developed aspectual meanings, which include near-future aspect and affirmative aspect (used in an irrealis situation), the latter forming a complementary set of irrealis/realis aspectual meanings with *iu1/rhiu1* 有+VP. This essay refines the semantic evolution path of *hui* 會 based on previous research by using the Hakka corpus, suggesting the critical position of habitual tendency and potential property in the grammaticalization of epistemic modality, and explaining the relationship between the ability meaning of *voi5/6* 會 and its modality features.

Keywords: *voi5/6* 會, Hakka, dynamic modality, epistemic modality, irrealis

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Denominal derivations in Puyuma and Paiwan: A preliminary study

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A denominal verb (DNV) is a morphologically complex word which consists of a nominal stem (or a noun phrase) that can be an independent word and a verbal affix that does not otherwise appear as a free-standing verb. The complex word serves as the predicate of the clause, and the nominal stem corresponds to one of the arguments of the verb. Prototypically, the nominal stem (or a noun phrase) corresponds to the object of a transitive predicate. In the Formosan literature, this kind of construction is reported or listed, but there is, to my knowledge, no in-depth analysis, except Chen's (2022) study of Budai Rukai. This derivational morphology is used to perform similar functions across Formosan languages, even though most morphemes themselves are not cognate. This study is carried out from three aspects, i.e. (i) the distinction between DNVs and other similar constructions, (ii) the syntactic features of DNVs, and (iii) the challenges that DNVs bring to morphological theories.

Keywords: denominal derivation, incorporation, external modifier, null head, Puyuma, Paiwan

1. Introduction

This paper investigates denominal verb constructions in Puyuma and Paiwan. In the literature, two types of denominal derivation may be distinguished. In the first type, a denominal derivation is characterized as a construction whereby a nominal stem (e.g., *kabung* 'hat', as in (1a)) is attached by a verbal affix (*i-* 'to carry, to wear'), as in (1b). This affix does not otherwise appear as a free-standing verb, as illustrated by the ungrammaticality of (1c).

(1) Puyuma (Online dictionary)[1]

a.	*daleken*	*dratu*	***kabung***	*na*	*temakakesi.*
	<AV>wet	3.PSR.OBL	hat	DEF.NOM	student

'The students got their hats wet.'

[1] https://e-dictionary.ilrdf.org.tw/pyu/search.htm

b. ***m-i-kabung*** *i* *Senayan.*
AV-wear-hat SG.NOM Senayan
'Senayan wore a hat.'

c. ****m-i*** *i* *Senayan* *dra* *kabung.*
AV-wear SG.NOM Senayan INDF.OBL hat
(Intended for) 'I wore a hat.'

In the second type, the denominal verb is derived via a process of zero-conversion of a noun into a verb that has the meaning of the event inherently related to the noun. For instance, the noun *sangel* 'pillow' is used as a noun in (2a); it functions as an argument, and it forms a complex noun phrase with its modifiers (*nalumeljak* 'soft' and *ku=kaka* 'my younger sister'), whereas in (2b) and (2c), it functions as a predicate, and it may be infixed with a voice marker, as in (2b), and may appear in an imperative construction, as in (2c).

(2) Paiwan

a. *tjengelay* *ta* *nalumeljak* *a* ***sangel*** *a* *ku=kaka.*
like.AV OBL soft.AV LNK pillow LNK 1SG.GEN=younger.sibling
'My sister likes soft pillows.'

b. ***sangel****=aken* *ta* *kasiw.*
<AV>pillow=1SG.NOM OBL wood.
'I slept on a wooden pillow.' (Lit. 'I used the (piece of) wood as a pillow.')

c. ***sangel-u****!*
pillow-AV.IMP
'Sleep on a pillow!'

Only the first type of denominal derivation, as in (1b), will be investigated in this study, and this construction will be categorized henceforth as DNV (denominal verb). Except for Chen's (2022) investigation of similar constructions in Budai Rukai,[2] and De Busser's work (2009: 371–380) on Takivatan Bunun, there has not been any in-depth analysis of DNVs in the Formosan literature. In addition, most references focus on the meaning of the verbal affixes and different terms have been utilized to describe these affixes, including NI (Chen 2022), patient-incorporating prefixes (De Busser 2009), and composite verbs (Zeitoun et al. 2015). In dictionaries (e.g., Li & Tsuchida 2001; 2006) and sketch grammars (e.g., Sung 2018; Wu 2018), these are listed without any explanation or analysis.

[2] Chen's (2022) study is based on data from the Haocha variety.

The construction to be examined in this paper is very much like the phenomenon of noun incorporation (NI henceforth); as pointed out by Gerdts & Marlett (2008: 410), in either construction, "the elements denoting the meaning of a verb and a noun combine into a single word." In a typical example of NI, the same verb may be used as an independent verb and as a host of NI, as shown in the following Nahuatl examples.

(3) Huahtla Nahuatl (Mithun 1984: 860–861)

a. *askeman* *ti-'-kwa* ***nakatl***.
never you-it-eat meat
'You never eat meat.'

b. *na'* *ipanima* *ni-**naka**-kwa.*
I always I-meat-eat
'I eat it (meat) all the time.'

In (3a), the verb *kwa* 'eat' is indexed with *'*- 'it', which agrees with the independent patient nominal *nakatl* 'meat'; in (3b), the patient *naka*- 'meat' is incorporated into the verb. For the moment, we shall focus on the properties of DNVs from a crosslinguistic perspective, with a more detailed discussion of similarities and differences between DNVs and NIs to be given in later sections.

Morphologically, according to Gerdts & Marlett (2008: 413), there is no correlation between the position of the verb in the clause and the position of the verbal affix in DNVs; nevertheless, the verbalizers all appear as prefixes in all the Formosan languages. In their study, they also predict that if a language has only one denominal affix, it seems to be denoting the meaning of HAVE/DO/MAKE/GET (Gerdts & Marlett 2008: 413). They also mention that intransitive meanings, such as GO TO, are less frequent. This observation is interesting, as it also corresponds to what we have found in the Formosan languages, to a certain extent. Table one is a preliminary summary of the most common denominal affixes in some Formosan languages.

Table 1. Some denominal affixes in Formosan languages[3]

	Saisiyat	**Seediq**	**Rukai**	**Paiwan**	**Puyuma**	**Bunun**	**Kavalan**	**Amis**	**Pazih**
get; gather	*ki-, ti-*	*k-*	*'i-*	*ki-*	*ki-*	*tin-*	*qi-, Ri-*	*ki-*	
carry; wear; have	*li-, pa-, shi-*	*k-; p-; s-*	*'i-*	*masi-/pasi-*	*mi-/pi-*	*kun-*	*si-*	*ci-*	*mati-; si-*
give birth to	*pash-*		*to-*	*pu-*	*mi-*	*tus-*			*mari-*
put; add	*po-*		*po-*	*pu-*	*pu-*	*su-*			
make, produce	*ti-*	*p-*	*to-*	*sane-*	*tu-*		*sa-*	*sa-*	*matu-*
remove	*ki-*		*'o-*	*su-*			*su-*		
eat	*paa-; ko-*					*ku-; 'ik-*			
chop	*kin-*								
plant	*sho-*								
wash	*ta:-*					*tal-*			
pour	*po-*								
ride			*'ano-*			*tum-*	*qa-*	*maka-*	
go to			*mo-*		*mu-*	*mun-*			

There are two things to note: (i) the most productive affixes are used in denoting meanings of HAVE/DO/MAKE/GET, as have been predicated by Gerdts & Marlett's (2008) study; (ii) most denominal affixes that occur in DNVs are not cognates. Only four morphemes have been reconstructed back to Proto-Austronesian: **ki-* 'to get' (Zeitoun & Teng 2009); **u-* 'go to' (Blust 2003),[4] **Si-/si-* 'to carry, to wear, to have' (Teng 2014), and **ku-* 'to eat' (Ross & Zeitoun 2023).

Syntactically, DNVs can be used transitively and intransitively, and in this respect, they are similar to NIs. In Puyuma, DNVs may be manifested as AV (actor voice) or UV (undergoer voice), as shown in (4).[5] On the other hand, DNVs are relatively rare in undergoer voice in Paiwan; there is only one example found in my corpus, as shown in (5).

[3] Sources are based on the following references: Saisiyat (Zeitoun et al. 2015); Seediq (Sung 2018); M. Rukai (Zeitoun 2007); Paiwan (Chang 2006); Puyuma (Teng 2008, Online dictionary); Bunun (De Busser 2009); Kavalan (Li & Tsuchida 2006); Amis (Wu 2018); Pazih (Li & Tsuchida 2001).

[4] The Proto-Austronesian motion prefix reconstructed in Blust (2003: 452–453) is **mu-*, but the element **m-* should be treated as a voice affix.

[5] Like most Formosan languages, the voice system in Puyuma and Paiwan makes a four-way distinction, including actor voice, patient voice, locative voice and circumstantial voice. This four-way distinction is sometimes viewed as a dichotomy between AV (actor voice) vs. UV (undergoer voice). In such a system, the semantic role of the subject is indicated by a voice marker on the verb, as shown in the following Puyuma examples.

(4) Puyuma (Online dictionary)

a. *an* *adri=ku* ***m-i-kiping*** *kana* *bulretrenganan* *i,*
if NEG=1SG.NOM AV-wear-clothes DEF.OBL tradition TOP
nu=pa~punang-i=ku?
2SG.GEN=RED~scold=1SG.NOM
'If I don't wear traditional clothes, will you scold me?'

b. *dalekan* *ku=kiping* *aw,* ***ti=pi-kiping-aw****=driya*
wet.AV 1SG.PSR.NOM=clothes and 1SG.GEN=wear-clothes-PV=IPFV
nu=kiping.
2SG.PSR.NOM=clothes
'My clothes are wet, and so I am going to wear your clothes.'

(5) Paiwan (Online dictionary)

a. *nakuya* *a* ***pu-cimed*** *ta* *tima=anga.*
bad.AV LNK add.AV-enemy OBL who=COS
'It is bad to have enemies.'

b. *tja=****si-pu-ljaceng*** *a* *samaq* *tua* *zalja.*
1PL.GEN=CV-add-vegetable NOM lettuce OBL millet
'We add lettuce into the millet.'

In either language, DNVs may exhibit a "stranding" modifier, which appears on semantic grounds to modify the nominal stem of the predicate. For example, in (6a), *sadru* 'many' is preceded by an oblique case marker, and from the translation, it appears to modify the nominal stem *latak* 'star fruit'.

(i) Katripulr Puyuma

a. *tr<****em****>ekav=****ku****actor* *za* *kawi* *kana* *wariwari.*
<AV>chop=1SG.NOM IND.OBL wood DEF.OBL everyday
'I chopped wood everyday.'

b. *tu=karatr-****aw****=****ku****patient* *kanini* *na* *suan.*
3GEN=bite-PV=1SG.NOM this.OBL LNK dog
'This dog bit me.'

c. *tu=veray-****ay****=****ku****location* *za* *paisu.*
3GEN=give-LV=1SG.NOM IND.OBL money
'He gave me money.'

d. *tu=padang-****anay****=****ku****beneficiary* *za* *kavang.*
3GEN=prepare-CV=1SG.NOM IND.OBL clothes
'She prepared some clothes for me.'

(6) Puyuma

a. *ki-latak=mi* *dra* *sadru.*
get.AV-star.fruit=1PL.EXCL.NOM INDF.OBL many
'We picked a lot of star fruit.'

b. *m-i-libeng=mi* *dra* *banin.*
AV-have-wall=1PL.EXCL.NOM INDF.OBL wooden.board
'We have a wall that is made of wooden board.'

(7) Paiwan

a. *masi-tjalupung* *ti* *kaka* *tua* *qudjidjilj.*
wear.AV-hat SG.NOM older.sibling OBL red
'My brother wore a red hat.'

b. *su-kava-u* *tua* *lrilualuas.*
remove-clothes-AV.IMP OBL green
'Take off the green clothes.'

Another interesting phenomenon is the so-called "noun doubling". For instance, the noun *ciqaw* 'fish' appears twice in (8); as a nominal stem in the predicate and as a free noun preceded by an oblique case marker.

(8) Paiwan

*na=ki-**ciqaw**=aken* *tua* ***ciqaw**.*
PFV=catch.AV-fish=1SG.NOM OBL fish
'I have caught a fish.'

To summarize, several generalizations about denominal verb constructions can be made:

(i) A denominal verb is a morphologically complex word, which consists of a nominal stem (which can act as an independent word) and a verbal affix which does not otherwise appear as a free-standing verb.
(ii) The complex word serves as the predicate of the clause, and the nominal stem semantically refers to one of the participants of the event denoted by the predicate (typically the patient).
(iii) DNVs may exhibit the phenomena of "stranding" modifiers and "noun doubling".

As has been mentioned earlier, DNVs and NI share many properties, and in the literature, DNVs are often treated as a subtype of NI. Diachronically, Mithun (1984: 891) has observed that in some languages "relics of older NI processes have developed into productive systems of affixation", but Jacques (2012: 1207) has proposed a different direction of development based on data from Japhug. However, it is not the purpose of the present paper to justify whether or not the constructions to be discussed in this paper (DNVs) are a subtype of NI, neither is it the goal of this paper to address the developmental path of the twice named construction. As a matter of fact, this is an area of research for which little is known and much is awaiting exploration. The goal, therefore, is to provide an adequate empirical foundation for future studies. Thus, the term "denominal verb construction" is adopted to refer to these constructions for two reasons: (i) to avoid possible confusion: NI has been used to describe distinct constructions in Formosan literature (cf. Wu & Chang 2005 and Wu 2020 on Paiwan vs. Chen 2022 on Rukai); (ii) to keep my position neutral with regard to the debate on whether or not the DNVs are a subtype of NIs.

The organization of the paper is as follows. §2 is a literature review on NI. §3 deals with transitivity and the encoding of arguments in a DNV, whereas §4 focuses on the manifestation of modifiers and their semantic subtypes. §5 concludes the study and points out directions for further study.

2. Denominal derivations vs. NI

A brief account of Puyuma and Paiwan DNVs is given in the previous section. Similar constructions in the Formosan literature, e.g., Chen (2022), are analyzed as NI. Traditionally, NI is defined as a construction where a noun is incorporated into a verb (both the noun and the verb are morphologically independent), resulting in a single complex word. Following Johns (2017) and Chung & Ladusaw (2020), Chen (2022: 121) does not view morphological independency as a necessary requirement for NI. The likeness or difference between these two constructions has resulted in much discussion in the literature. Some linguists, e.g., Gerdts (1998), Mithun (1984; 1986; 2010), posit that NI is a process distinct from denominal verb formation, while others (e.g., Sadock 1980; Johns 2017; Olthof 2020) view that denominal verbs are a subtype of NI. Although denominal verbs display characteristics that are typically attributed to NI, including the generic interpretation of the object, the "stranding" of modifiers and the appearance of noun doubling, there is one aspect in which the two are crucially different, in addition to the morphological dependency of both the verbal and nominal elements in DNVs and NIs. As pointed out by

Haugen (2008: 440–442), "…NI is typically optional and thus amenable to discourse-functional manipulation, whereas denominal verbs require the incorporation of their nominal objects." The purpose of this section is to provide a platform for the following discussion by reviewing NI from a typological perspective (§2.1) and related studies in the Formosan literature (§2.2).

2.1 NIs vs. DNVs from a typological perspective

This section reviews Mithun's (1984) and Rosen's (1989) classification of NIs, since they are relevant to my discussion of DNVs if the criterion for morphological independence and the possibility of paraphrase are disregarded.

Morphologically, NI is a salient feature to many polysynthetic languages, as illustrated by the Nahuatl examples in (9). In (9a), *nacatl* 'flesh' is a free-standing noun outside the predicate, whereas in (9b) it is incorporated into the verb complex. On the other hand, in Paiwan, the denominal affix *sane-* 'to make' is morphologically dependent, as shown in the contrast between (10a–b).

(9) Nahuatl (Gerdts & Marlett 2008: 409)

a. *ni-c-qua* *in* *nacatl.*
I-it-eat the flesh
'I eat the flesh.'

b. *ni-naca-qua.*
I-flesh-eat
'I eat flesh.'

(10) Paiwan (Online dictionary)

a. *na=san-seluc* *ti* *kama.*
PFV=<AV>make-trap SG.NOM father
'Father made a trap.'

b. **na=sane* *ti* *kama* *tua* *seluc.*
PFV=<AV>make SG.NOM father OBL trap
(Intended for) 'Father made the trap.'

In addition to morphological independency, the possibility of syntactic paraphrases is another feature that shows NIs and DNVs are distinctive. It needs to be emphasized that a change of meaning (definite vs. generic of the object) is induced by the alternation between (9a) and (9b). In fact, according to Mithun (1984: 848), "the fact that productive morphological construction of this type (NIs) never exist in a language without syntactic analogs indicates that the morphologization itself must be functional." Based on this observation, she (Mithun 1984) identifies four types of NIs based on their functions in contrast with their non-incorporated counterpart. She suggests that while all the first three types result in a backgrounding of the incorporated noun, Type I serves to reduce its salience within the V, Type II within the clause, and Type III within a particular portion of the discourse (Mithun 1984: 862). In Type IV, the incorporated nominal stem is accompanied by an external NP, forming a classificatory system. (11a) serves as an example of Type I, where the direct object *urapá* 'bow' is incorporated, reducing the transitivity of the verb (i.e., there is no object pronoun indexed on the verb). Type II goes a step further in advancing a peripheral argument to direct object or subject position. For instance, (11b) is a non-incorporated counterpart of (11c), in which the direct object *oβá* 'face' occurs external to the predicate, but the transitive verb is indexed with *yos* 'it'. When the object *oβá* 'face' is incorporated, the affected argument (him) is advanced to direct object status, as shown by the pronoun *s-* in the predicate in (11c).

(11) Tupinambá (Cited in Mithun 1984: 856–857)

a. *a-urapá-pirár.* (Type I)
I-bow-open
'I draw my bow.'

b. *s-oβá* *a-yos-éy.*
his-face I-it-wash
'I wash his face.'

c. *a-s-oβá-éy.* (Type II)
I-him-face-wash
'I face-washed him.'

Type III is used to background known or incidental information within discourse. The following sentences are excerpted from a Gunwinggu (Australian) tale. In (12a), *mangun* 'honeybag' is new and appears as an independent noun; in (12b), *dabu* 'honeycomb' is incorporated because it does not constitute new information in the story.

(12) Gunwinggu (Cited in Mithun 1984: 866–867)

a. *...galug* *gumegbe* ***mangun*** *naŋ.*
then there honeybag saw
'…when he saw a sugar bag.'

b. *dja* *dabu-bagmeŋ* *wiriwiriya:g* *dolgaŋ* *dabu-mey*
and honeycomb-broke bird.sp. got.up honeycomb-took
galug ***dabu-****ŋuneŋ.*
then honeycomb-ate
'The honeycomb broke. The wiriwiriyag bird got up and took the honeycomb and ate it.'

Sentences in (13) illustrate Type IV NI, in which a more generic noun is accompanied by an overt external NP.

(13) Gunwinggu (Cited in Mithun 1984: 867)

a. *...bene-****dulg****-naŋ* *mangaralaljmayn.*
they.two-tree-saw cashew.nut
'…They saw a cashew tree.'

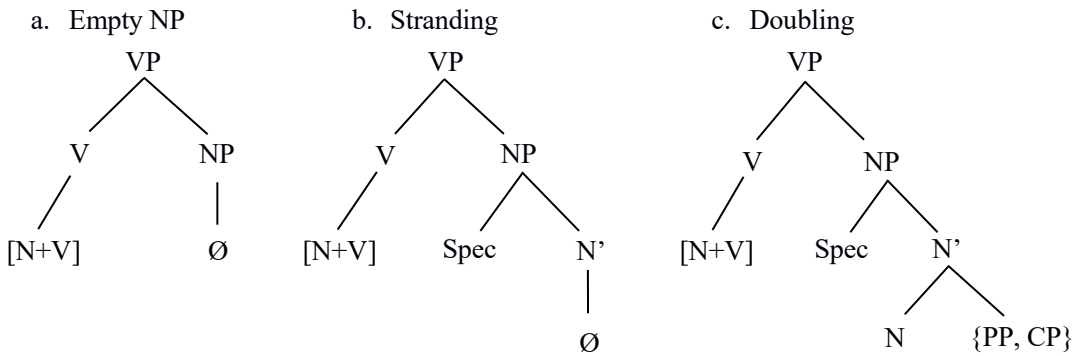
b. *...bene-ṛed-naŋ* *ṛedgereŋeni.*
they.two-camp-saw camp.new
'They saw a new camp.'

Approaching the issue from a morphosyntactic perspective, Rosen (1989) suggests that the formation of NIs is a lexical process, as oppose to Sadock's (1980; 1986) and Baker's (1988) proposals, which view NI as a syntactic process, and that Mithun's (1984) four-type distinction can be reclassified into two major groups based on their different grammatical properties, including (i) compounding NI, which embraces Mithun's Type I to Type III, and (ii) classifying NI, which corresponds to Mithun's Type IV. She (Rosen 1989: 295–297) further suggests that in a compounding NI, a noun and a verb combine to form a complex verb, and one argument of the verb is satisfied within the verb. As a result, the complex verb only takes one argument, and is thus intransitive.[6] In a classifying NI, on the other hand, the transitivity of the complex verb is

[6] This view is distinct from Mithun's view on the function of NIs; Rosen (1989) regards compounding NIs as a kind of valence decreasing mechanism, whereas Mithun (1984) sees them as a backgrounding strategy. While Rosen's (1989) classification is based on the distinctive grammatical properties the types of NIs exhibit, Mithun's (1984) classification is more on a functional basis.

unaffected, and the incorporated noun acts like a classifier on the noun it is associated with. Since this incorporated noun does not act like an argument to the NI, an object NP must co-occur with NI to satisfy the verb's argument structure. Three subtypes of classifier NI are distinguished according to the manifestation of this object NP: (i) empty NP, where the object NP is completely empty, as in (14a); (ii) stranding, where the specifier is overt but N' is empty, as in (14b); doubling, where the entire NP is filled, as in (14c).

(14) Types of classifier NI (Rosen 1989: 297–298)



Although Puyuma and Paiwan data investigated in this paper correspond to Rosen's (1989) classifying type (or Mithun's (1984) classificatory NIs), the relationship between the "stranding" item and the incorporated noun is much more complex than Rosen has depicted. We shall come to this in §3.

2.2 DNVs vs. NIs in Formosan literature

In Chen's (2022) study on Budai Rukai, this process is treated as NI. In (15a) *daane* 'house' is an argument of *wadreele* 'see', whereas in (15b) it is affixed with a verbal prefix *tu-* 'to make' to form a verb *tu-a-daane* 'to build a house'. Example (15c) shows that the verbal element *tu-* is unable to stand alone.

(15) Budai Rukai (Chen 2022: 118)

a. *wa*[7] *-dreele=aku* *ku* *daane.*
NFUT-see=1SG.NOM ACC house
'I saw the house.'

b. *tu-a-daane=aku.*
make-NFUT-house=1SG.NOM
'I built a house/houses.'

c. **tu-a=aku* *ku* *daane.*
make-NFUT=1SG.NOM ACC house
(Intended for) 'I built a/the house.'

Based on whether "doubling" is possible, Chen (2022) distinguishes two types of NIs: (i) simple NIs exhibit unergative properties and they express atelic events (16), and (ii) NIs with doubling are transitive and they convey telic events (17).

(16) Budai Rukai simple NI (Chen 2022: 140)

a. *lri-tu-apwi*[8] *ka* *ama.*
FUT-make-fire NOM father
'Father will start a fire.'

b. *lri-tu-ngadra* *kay* *urasi.*
FUT-make-tuber DEM sweet.potato
'The sweet potatoes will produce tubers.'

(17) Budai Rukai doubling NI (Chen 2022: 145)

a. *tu-a-daane* ***ku*** ***daane*** *ka* *Sula.*
make-NFUT-house ACC house NOM Sula
'Sula built a/the house.'

b. *tu-a-daane* *kay* *daane* *ka* *Sula.*
make-NFUT-house DEM house NOM Sula
'Sula built this house.'

[7] There is actually a morpheme break within *wa-; w-* is the active voice marker and *a-* marks "non-future", as shown in Chen's analysis of (15b).

[8] It should be written as *apui*, according to Elizabeth Zeitoun (pers. comm., September 2023).

c. *tu-a-daane* *ku* *balrawbau* *ka* *Sula.*
make-NFUT-house ACC tent NOM Sula
'Sula built a/the tent.'

On the other hand, in Wu's (2020) study of Paiwan NI, similar constructions as presented in (18) (=(10)) are not included as his target constructions, and his definition of NI seems to be distinct from that of Chen's (2022).[9]

(18) Paiwan (Online dictionary) (=(10))
a. *na=san-seluc* *ti* *kama.*
PFV=<AV>make-trap SG.NOM father
'Father made a trap.'
b. **na=sane* *ti* *kama* *tua* *seluc.*
PFV=<AV>make SG.NOM father OBL trap
(Intended for) 'Father made the trap.'

Wu (2020: 97–98) distinguishes two types of NI in Paiwan. In the first type, a nominal stem combines with a verb, as in (19a), whereas in the second type, a full noun phrase (including its modifier and case marker) is incorporated, as in (19b–c). He (Wu 2020: 102) further states that for the first type of NI, "only the category of spatial (motion/location/path) verbs triggers NI." According to his definition, sentences in (20) are not analyzed as NI, although the reason for exclusion is unknown to me.

(19) Paiwan (Wu 2020: 98)
a. *na-sa-pana=aken.*
PFV-<AV>go.to-riverbank=1SG.NOM
'I went to riverbank.'
b. *kasi-tjay-palang=aken* *a* *mangtjez.*
<AV>from-OBL-Palang=1SG.NOM LNK come.back
'I came back from Palang's (place).'
c. *i-tua-tapaw-ni-camak=aken.*
in-OBL-hut-GEN-Camak=1SG.NOM
'I am in Camak's hut.'

[9] Wu (2020) focuses on whether or not the incorporated noun is a nominal root or a case-marked noun phrase, but he has not mentioned whether or not the verb needs to be morphologically independent.

(20) Paiwan (Online dictionary)

a. *na=**san**-sipaizan* *ta* *ngat* *ti* *kama.*
PFV=<AV>make-fan OBL shell.flower SG.NOM father
'Father used the shellflower to make a fan.'

b. *uri=ki-qinuman=amen* *tua* *vasa.*
PROG=get.AV-crop=1P.EXCL.NOM OBL taro
'We are going to harvest taros.'

In Takivatan Bunun, similar constructions are termed "patient-incorporating prefixes" by De Busser (2009: 371), and he views this process as "the inverse of noun incorporation", in which a nominal host is prefixed with a verbal affix with event semantics to derive a verbal form. Some examples are given in (21). Teng et al. (2017) reported that in Bunun noun doubling is only permitted when there is a possessor.

(21) Takivatan Bunun patient-incorporating prefixes (De Busser 2009: 376–377)

a. *tin-* 'pick, harvest, get'
tin-huduq 'pick bamboo' < *huduq* 'bamboo sprout'
tin-hutan 'harvest yams' < *hutan* 'yam'
tin-lukis 'cut trees' < *lukis* 'tree'

b. *tal-* 'wash (body parts)'
tal-laqais 'wash one's face' < *laqais* 'face'
tal-hima 'wash one's hands' < *hima* 'hand'

(22) Isbukun Bunun[10]
*kun-**tapis**-an*[11] *=ik* *mas* *'is-tama'* ***tu*** ***tapis***.
wear.AV-black.cloth-?=1SG.NOM OBL belong.to-father LNK black.cloth
'I wore father's black clothing.'

[10] De Busser (2009: 373) reports that *kun-* 'wear' is only used for shoes in Takivatan Bunun, but in Isbukun Bunun, there is no such restriction.

[11] As pointed out by a reviewer, the suffix *-an* in (34) is related to the derivation of Bunun color terms, which should not be confused with the locative voice marker *-an*.

3. Denominal derivations in Puyuma and Paiwan

This section describes the DNVs in Puyuma and Paiwan. Special attention will be paid to the properties of the "stranding" element and its relationship with the incorporated noun.

3.1 Position and marking of the modifiers

In Puyuma, DNVs are often followed by a case-marked element, which semantically "modifies" the incorporated noun. This is called a "stranding modifier" in the literature (e.g., Rosen 1989) as there is no head noun. They mostly occur immediately after the DNV. For instance, the actor/subject *nanalri* 'my mother' cannot intervene between DNV and the stranding modifier *bulay* 'beautiful', unless the actor is manifested as a clitic pronoun, as shown in (23).

(23) Nanwang Puyuma

a. **m-i-drana'* *i* *nanalri* ***dra*** ***bulay***.
AV-wear-necklace SG.NOM my.mother INDF.OBL beautiful.AV
'My mother wore a beautiful necklace.'

b. *m-i-drana'* ***dra*** ***bulay*** *i* *nanalri.*
AV-wear-necklace INDF.OBL beautiful.AV SG.NOM my.mother

c. *m-i-drana'=ku* ***dra*** ***bulray***.
AV-wear-necklace=1SG.NOM INDF.OBL beautiful.AV
'I wore a beautiful necklace.'

In Paiwan there is no such restriction on the position of the stranding element. For instance, the order of the modifier *qudjidjilj* 'red' and the actor *kaka* 'elder sibling' is flexible in (24).

(24) Paiwan

a. *na=masi-tjalupung* *ti* *kaka* ***tua*** ***qudjidjilj***.
PFV=carry.AV-hat SG.NOM elder.sibling OBL red
'(My) brother carried a red hat with him.'

b. *na=masi-tjalupung* ***tua*** ***qudjidjilj*** *ti* *kaka.*
PFV=carry.AV-hat OBL red SG.NOM elder.sibling
'(My) brother carried a red hat with him.'

In Puyuma, there is a distinction between definite vs. indefinite in the oblique marking. In Nanwang Puyuma the stranding element is preceded by an indefinite oblique marker *dra*

'INDF.OBL' in the following sentences. A change of *dra* 'INDF.OBL' to *kana* 'DEF.OBL' is not acceptable, unless there is also a possessor, as illustrated in (25).

(25) Nanwang Puyuma

a. *m-i-drana'* *dra/*kana* *bulay* *i*
AV-wear-necklace INDF.OBL/DEF.OBL beautiful.AV SG.NOM
nanalri.
my.mother
'My mother wore a beautiful necklace.'

b. *m-i-drana'* *dra/*kana* *drua-a* *i*
AV-wear-necklace INDF.OBL/DEF.OBL two-CLF SG.NOM
nanalri.
my.mother
'My mother wore two necklaces.'

c. *m-i-drana'* *dratu/kantu* *drana'*
AV-wear-necklace 3.PSR.INDF.OBL/3.PSR.DEF.OBL necklace
kan *baelri* *i* *nanalri.*
SG.OBL my.elder.sibling SG.NOM my.mother
'My mother wore my sister's necklace.'

There is no such restriction in Katripulr Puyuma.

(26) Katripulr Puyuma

a. *aretid* *na* *wari* *zi,* *m-i-kavang=u*
cold.AV DEF.NOM day and AV-wear-clothes=2SG.NOM
kana *alripit.*
DEF.OBL thin.AV
'The weather is cold, and you are wearing thin clothes!'

b. *sahar* *m-i-sikutu* *kana* *lriketri* *ini* *na* *vavayan.*
like.AV AV-wear-skirt DEF.OBL short this.NOM LNK female
'This girl likes to wear the short skirt.'

The unacceptability of a definite marker in Nanwang Puyuma is related to the manifestation of voice, which is to be discussed in §3.2. To sum up the above discussion, while there are restrictions on the position of the stranding element and its marking in Puyuma, the position of the stranding element is relatively free in Paiwan.

3.2 Null head, doubling, and voice alternation

3.2.1 Null head

Rosen (1989: 296) suggests that "those languages that have classifier NI also allow what is commonly called 'stranding', a process whereby an NP modifier is left with no head noun." Depending on the occurrence of a modifier and/or a repeated NP, Rosen (1989: 297–298) distinguishes three types of classifying NIs (which have been given in (14)), which are corresponding to the following Puyuma and Paiwan examples of DNVs; (27a) and (28a) exemplify an empty type, where there is no doubled NP, nor a stranding modifier; (27b) and (28b) represent a stranding type, with a modifier stranding without a head noun; (27c) and (28c) exhibit a doubling type, where the incorporated noun is repeated again as an independent noun.

(27) Nanwang Puyuma

a. *m-i-kabung=ku.*
AV-wear-hat=1SG.NOM
'I wore a hat.'

b. *m-i-kabung=ku* *dra* *utreutrem.*
AV-wear-hat=1SG.NOM INDF.OBL black
'I wore a black hat.'

c. *m-i-kabung=ku* *kantu* *kabung* *kan* *baeli.*
AV-wear-hat=1SG.NOM 3.PSR.OBL hat SG.OBL elder.sibling
'I wore my brother's hat.'

(28) Paiwan

a. *ki-ljaceng=aken.*
get.AV-vegetable=1SG.NOM
'I plucked (some) vegetables.'

b. *masi-tjalupung=aken* *tua* *qudjidjilj.*
carry.AV-hat=1SG.NOM OBL red
'I brought a red hat.'

c. *ki-ljaceng=aken* *tua* *ljaceng* *ni-a* *Kuljelje.*
get.AV-vegetable=1SG.NOM OBL vegetable GEN-PL Kuljelje
'I plucked Kuljelje's vegetables.'

Under this analysis, the incorporated noun does not serve as an argument of the verb, and thus, an independent noun (may be overt or covert) is required to satisfy the verb's argument structure. In other words, in sentences like (27b), what the stranding modifier *utreutrem* 'black' modifies is a null NP, not the incorporated noun. This analysis requires sentences with the argument of the verb occurring with a null head, as shown in the Mohawk examples below: in (29a) the 'dress' in incorporated, and *kanekwarunyu* 'dotted' is a stranding with no head noun, whereas in (29b), the modifier is again left stranded, but this time there is no incorporated noun at all.

(29) Mohawk (Mithun 1984: 870)

a. *kanekwarunyu* *wa'-k-akya'tawi'tsher-u: ni.*
it.dotted.DIST PAST-I-dress-make
'I made a polka-dotted dress.'

b. *kanekwarunyu* *wakatkahtho.*
it.dotted.DIST PAST.I.see
'I saw a polka-dotted (one).'

In Puyuma, a null head with a stranding modifier is very common. In the following sentences, the whole semantic head *kabung* 'hat' can be omitted, and the order of the head and the modifier *utreutrem* 'black' is flexible. Note that both the head and the modifier are preceded by the same marker.

(30) Puyuma

a. *sagar=ku* *dra* *utreutrem* *(dra* *kabung).*
like.AV =1SG.NOM INDF.OBL black INDF.OBL hat
'I like black ones/hats.'

b. *bulay* *na* *utreutrem* *(na* *kabung).*
beautiful.AV DEF.NOM black DEF.NOM hat
'The black one/hat is beautiful.'

c. *ulaya* *a* *utreutrem* *(a* *kabung).*
exist.AV INDF.NOM black INDF.NOM hat
'There is a black one/hat.'

Paiwan noun phrase structure exhibits similar properties; that is, a modifier may be left stranded without the accompaniment of a head noun, as shown in (31a) and (31c). The order of the head *kun* 'skirt' and the modifier is flexible, but the case marker only occurs in the first element, and

there is a linker *a* connecting them. Note that among the different kinds of modifiers, numerals act differently; they are preceded by *tu* regardless of its position (before or after the head noun).[12]

(31) Paiwan (Tang et al. 1998: 355)

a. *na=v<en>eli ti Kai tua/*tu vaquan (a kun).*
PFV=<AV>buy NOM Kai OBL new.AV LNK skirt
'Kai bought a new one/(skirt).'

b. *na=v<en>eli ti Kai tua/*tu kun a vaquan.*
PFV=<AV>buy NOM Kai OBL skirt LNK new
'Kai bought a new skirt.'

c. *na=v<en>eli ti Kai tua telu (a kun).*
PFV=<AV>buy NOM Kai OBL three LNK skirt
'Kai bought three (of them).'

d. *na=v<en>eli ti Kai tua kun tu telu.*
PFV=<AV>buy NOM Kai OBL skirt OBL three
'Kai bought three skirts.'

The fact that a null head is acceptable in (30) and (31) indicates that in Puyuma and Paiwan the nominal stem in a DNV does not act as an argument to the derived verb, and the object argument is fullfilled by an independent NP, which on the surface may be covert with only a stranding modifier left.

Five types of modifiers are distinguished: it can be an attributive modifier, as in (32a) and (33a), a numeral modifier, as in (32b) and (33b), a demonstrative, as in (32c) and (33c), a possessor, as in (32d) and (33d), or it can be a specific kind of the more generic incorporated noun (32e) and (33e). Such a classification is not merely on a semantic basis; it also has a bearing on the syntactic properties, including (i) whether the modifier may be left stranded; (ii) whether a doubling noun is obligatory, optional or prohibited; and (iii) whether voice alternation is possible.

[12] Because *tu* only occurs before a numeral, it is analyzed as a partitive oblique marker in Tang et al. (1998: 355).

(32) Nanwang Puyuma

a. *m-i-kiruwan* ***dra*** ***dremalemdrem*** *i* *Pilray.*
AV-wear-clothes INDF.OBL purple SG.NOM Pilray
'Pilray wore purple clothes.'

b. *m-i-drana'=ku* *dra* *misasa.*
AV-wear-necklace=1SG.NOM INDF.OBL one
'I wore one necklace.'

c. *pi-kiping-u* *idrunu.*
wear-clothes-PV.IMP this.NOM
'Wear this one!'

d. *m-i-trukap=ku* *dratu* *trukap* *dra* *walrak.*
AV-wear-shoe=1SG.NOM 3.PSR.INDF.OBL shoe INDF.OBL child
'I wore children's shoes.'

d'. **m-i-trukap=ku* *dra* *walrak.*
AV-wear-shoe=1SG.NOM INDF.OBL child
'I wore children's shoes.'

e. *m-i-rawa* *dra* *marenem* *i* *Inbu.*
AV-have-pray INDF.OBL sambar SG.NOM Inbu
'Inbu has hunted a sambar.'

(33) Paiwan

a. *na=masi-tjevet* *ti* *kaka* ***tua*** ***qecengecengel.***
PFV=carry.AV-skirt SG.NOM elder.sibling OBL black
'My brother has brought black skirts with him.'

b. *na=masi-sangel=aken* *tu* *drusa.*
PFV=carry.AV-pillow=1SG.NOM OBL two
'I brought two pillows.'

c. *na=masi-sangel=aken* *tazua.*
PFV=carry.AV-pillow=1SG.NOM that.OBL
'I brought that pillow.'

d. *ki-ljaceng=aken* *tua* *ljaceng* *ni-a* *Kuljelje.*
get.AV-vegetable=1SG.NOM OBL vegetable GEN-PL Kuljelje
'I picked Kuljelje's vegetables.'

d'. **ki-ljaceng=aken* *ni-a* *Kuljelje.*
get.AV-vegetable=1SG.NOM GEN-PL Kuljelje
'I picked Kuljelje's vegetables.'

e. *uri=ki-qinuman=amen* *tua* *vasa.*
FUT=get.AV-crops=1PL.EXCL.NOM OBL taro
'We are going to harvest taros.'

As shown in the examples above, there is an overt independent noun accompanied by a possessor in (32d) and (33d). In these examples, omission of the independent noun (i.e., a null head) is not acceptable, as illustrated in (32d') and (33d'). The same restriction (i.e., the head in a possessive construction cannot be omitted) may be applied to other Formosan languages, as in Bunun (34) and Thao (35).

(34) Isbukun Bunun

a. *kun-**tapis**-an=ik* *mas* *'is-tama'* ***tu*** ***tupis***.
wear.AV-black.cloth-?=1SG.NOM OBL belong.to-father LNK black.cloth
'I wore father's black clothing.'

b. **kun-tapis-an=ik* *mas* *'is-tama'.*
wear.AV-black.cloth-?=1SG.NOM OBL belong.to-father
'I wore father's black clothing.'

(35) Thao (Huang 2000: 53)

a. *'azazak* *ma-**tamuhun*** *mihu'* *wa* ***tamuhun***
child wear.AV-hat 2SG.GEN LNK hat
'The child wore your hat.'

b. **'azazak* *ma-**tamuhun*** *mihu'*
child wear.AV-hat 2SG.GEN
'The child wore your hat.'

3.2.2 Doubling

We have shown that the true argument of the DNV is the independent NP (which may be covert), not the nominal stem inside the DNV. When the independent NP is manifested overtly, it is described as "noun doubling" in the literature. Noun doubling is: (i) obligatory when there is a possessor (as has been shown in (32d) and (33d)), (ii) optional in cases where there is an

attributive, a numeral, or a demonstrative modifier (36a–c), and (iii) prohibited when the independent noun denotes a specific type of the nominal stem of the verb. Examples are given below:

(36) Nanwang Puyuma

a. *m-i-**kiruwan*** *dra* *dremalemdrem* *dra* ***kiruwan***
AV-wear-clothes INDF.OBL purple INDF.OBL clothes
i *Pilray.*
SG.NOM Pilray
'Pilray wore purple clothes.'

b. *m-i-**drana'**=ku* *dra* *misasa* *dra* ***drana'**.*
AV-wear-necklace=1SG.NOM INDF.OBL one INDF.OBL necklace
'I wore one necklace.'

c. *pi-**kiping**-u* *idrunu* *na* ***kiping**.*
AV-wear-UV.IMP that.NOM DEF.NOM clothes
'Wear that one!'

d. ***m-i-**rawa* *dra* *marenem* *dra* ***rawa*** *i*
AV-have-pray INDF.OBL sambar INDF.OBL pray SG.NOM
Inbu.
Inbu
'Inbu has hunted a sambar.'

(37) Paiwan

a. *na=masi-**tjevet*** *ti* *kaka* *tua* *qecengecengel*
PFV=carry.AV-skirt SG.NOM elder.sibling OBL black
a ***tjevet**.*
LNK skirt
'My brother has brought black skirts with him.'

b. *na=masi-sangel=aken* *tu* *drusa* *a* *sangel.*
PFV=carry.AV-pillow=1SG.NOM OBL two LNK pillow
'I brought two pillows.'

c. *na=masi-sangel=aken* *tazua* *a* *sangel.*
PFV=carry.AV-pillow=1SG.NOM that.OBL LNK pillow
'I brought that pillow.'

d. **uri=ki-qinuman=amen* *tua* *vasa* *a* *qinuman.*
FUT=get.AV-crops=1PL.EXCL.NOM OBL taro LNK crops
'We are going to harvest taros.'

It is worth noting that in Paiwan, when the attributive modifier denotes the color or the size of a null head, the stranding modifier and the nominal stem may switch their position, as in (38). Such an intriguing feature is never reported in other languages and deserves further study.

(38) Paiwan

a. *na=masi-tjevet* *ti* *kaka* *tua* *qecengecengel.*
PFV=carry.AV-male.skirt NOM elder.sibling OBL black
'My brother brought a black male skirt.'

b. *na=masi-qecengecengel* *ti* *kaka* *tua* *tjevet.*
PFV=carry.AV-black NOM elder.sibling OBL male.skirt
'My brother brought a black male skirt.'

c. *na=masi-tjalupung=aken* *tua* *kedri.*
PFV=carry.AV-hat=1SG.NOM OBL small
'I brought a small hat.'

d. *na=masi-kedri=aken* *tua* *tjalupung.*
PFV=carry.AV-small=1SG.NOM OBL hat
'I brought a small hat.'

3.2.3 Voice alternation

Definiteness of the undergoer plays a major role in the choice of voice in Nanwang Puyuma (cf. Teng 2008; 2024). When the undergoer is indefinite, the verb is manifested as actor voice; when the undergoer is definite, undergoer voice is preferred. In general, voice alternation between AV and UV is permitted in Puyuma, except when the modifier is a demonstrative, where only UV is allowed. This is expected since it conforms to the predication that a definite undergoer is required to be put in the subject position. So far only examples of AV denominal verb constructions have been given when there is an attributive, a numeral, or a possessive modifier, or the independent NP denotes the type of the nominal stem specifically. Examples of their UV counterparts are provided below.

(39) Nanwang Puyuma

a. *tu=pi-drana'-aw* *na* *bulay* *kan* *nanalri.*
3GEN=wear-necklace-PV DEF.NOM beautiful.AV SG.OBL my.mother
'My mother wore the beautiful necklace.'

b. *tu=pi-drana'-aw* *na* *drua-a* *kan* *nanalri.*
3GEN=wear-necklace-PV DEF.NOM two-CLF SG.OBL my.mother
'My mother wore the two necklaces.'

c. *tu=pi-drana'-aw* *tu=drana'* *kan* *baelri.*
3GEN=wear-necklace-PV 3.PSR.NOM=necklace SG.OBL my.elder.sibling
'She wore my sister's necklace.'

d. *ki-kulang-u* *na* *duli* *aw* *abel-u!*
get-vegetable-PV.IMP DEF.NOM red.quinoa and cook.vegetables-PV.IMP
'Get the red quinoa and cook it.'

When there is a demonstrative, only UV is permitted.

(40) Nanwang Puyuma

a. *pi-**kiping**-u* *idrunu* *na* ***kiping**.*
wear-clothes-PV.IMP that.NOM DEF.NOM clothes
'Wear that one!'

b. **pi-kiping* *kandru* *na* *kiping.*
wear.IMP.AV-clothes that.OBL LNK clothes
(Intended for) 'Wear that one!'

There are fewer examples of UV DNVs in Paiwan; only examples with a numeral modifier (41b) or an attributive modifier (41c) are found in my corpus. What is interesting to note is that in these patient voice examples, in addition to an actor and a patient, there is also an instrument, and it is this instrument, not the patient, that serves as the subject. For example, the null patient *kava* 'clothes' in (41b) and *itung* 'traditional clothes' in (41c) are not selected as the subject in these PV sentences; what serves as the subject is *makalrilaw* 'cloth' in (41b) and *qeri nua likuljaw* 'leopard's skin' in (41c).

(41) Paiwan

a. *na-sane-kava=aken tu drusa.*
PFV-<AV>make=1SG.NOM OBL two
'I made two clothes.'

b. *s<in>ane-kava ni kina tu drusa a makalrilaw.*
<PV>make-clothes GEN mother OBL two NOM cloth
'Mother used this piece of cloth to make two clothes.'

c. *makaya ane-itung-en tua payuan a qeri nua likuljav.*
can make-traditional.clothes-PV OBL Paiwan NOM skin GEN leopard
'The skin of leopard may be used to make traditional clothes of Paiwan.'

The above examples seem to show that voice selection in Paiwan DNVs is triggered by valency increasing, and that the semantic role of the subject (instrument, as in (41b–c)) does not seem to correspond to the voice marking (i.e., the verb is manifested as PV, not as CV as expected. We shall leave this for future research.

3.3 Interim summary

Table 2 summarizes the above discussion regarding the correlation between modifier type and the syntactic properties of DNVs. The two languages exhibit similar properties with regard to the correlation between types of modifiers and possibilities with a null head, a doubling noun, and voice alternations.

Table 2. Correlations between types of modifiers and syntactic properties

	Puyuma					**Paiwan**				
	POSS	ATT	NUM	DEM	SPEC	POSS	ATT	NUM	DEM	SPEC
Null head	×	√	√	√	√	×	√	√	√	√
Doubling	√	**(√)**	**(√)**	**(√)**	×	√	**(√)**	**(√)**	**(√)**	×
Voice alter	√	√	√	×	√	**---**	√	√	**---**	**---**

Chen (2022: 144–145) distinguishes two types of DNVs, those with doubling (42b–c) and those without (42a), and he (Chen 2022: 153) proposes that those with doubling convey telic events and are transitive, whereas those without doubling express atelic events and exhibit unergative properties. It is not clear if Budai Rukai conveys a stranding type, i.e., a stranding modifier with

a null head. The evidence for analyzing (42b) as transitive is based on the marking of the doubling noun. According to him, the doubling noun must be preceded either by an accusative marker (42b) or by a demonstrative (42c), but not an oblique marker (42d). If his analysis is on the right track, the doubling noun is the direct object of the verb as he proposes.

(42) Budai Rukai (Chen 2022: 144–146)

a. *lri-tu-apwi* *ka* *ama.*
FUT-make-fire NOM father
'Father will start a fire.'

b. *tu-a-daane* *ku* *daane* *ka* *Sula.*
make-NFUT-house ACC house NOM Sula
'Sula built a/the house.'

c. *tu-a-daane* *kay* *daane* *ka* *Sula.*
make-NFUT-house DEM house NOM Sula.
'Sula built this house.'

d. **tu-a-daane* *ki* *daane* *ka* *Sula.*
make-NFUT-house OBL house NOM Sula

4. Miscellaneous

In addition to the more typical types of DNVs discussed earlier, there are some miscellaneous types, which are not easy to categorize, and their semantic and/or syntactic properties deviate from the more typical types to a certain extent. This section will only briefly introduce these types as more data are required for a more in-depth analysis. Three types are introduced: DNVs with a locative stem, idiosyncratic DNVs, and DNVs with a complement.

4.1 DNVs with a locative stem

Prototypically, the nominal stem (or a noun phrase) corresponds to the object of a transitive predicate. In some languages, such as Puyuma, Saisiyat, Bunun, and Paiwan, the nominal stem may also correspond to a location. In Paiwan and Puyuma, the verbal affix denotes a motion, and the nominal stem conveys the goal of the motion. On the other hand, Saisiyat exhibits a very unusual type of DNV; what the verbal affix *kiray* 'put' incorporated is not the object of the transitive activity, but the goal of the activity. As is shown in (45), the semantic object *kaehoey* 'wood' occurs as an independent noun, not as the nominal stem of DNV.

(43) Katripulr Puyuma
m-u-zekalr *i* *Invilr.*
AV-go-village SG.NOM Invilr
'Invilr went to the village.'

(44) Paiwan (Wu & Chang 2005)
pasa-pana=aken *a* *vaik.*
move.to.AV-river=1SG.NOM LNK leave.AV
'I go to the river side.'

(45) Saisiyat (Zeitoun et al. 2015: 528)
yako *k<om>iray-latar* *ka* *kaehoey.*
1SG.NOM <AV>put-outside ACC wood
'I put (brush)wood outside.'

In Gerdts & Marlett's (2008: 413) survey, they mention that most popular verbal affixes are those with transitive meanings such as HAVE/GET/MAKE/PUT ON/REMOVE/MARRY/BUY/USE, but intransitive meaning GO TO is also found in the languages of North America. Many Formosan languages[13] exhibit the reflex of *usa 'go to', and this form is related to a dependent form *u- (reconstructed by Starosta (1995)) or *mu- (reconstructed by Blust (2003: 451)). This might be a piece of evidence showing that the verbal affixes of DNVs may have evolved from an earlier independent form.

4.2 Idiosyncratic DNVs

In Puyuma, the verbal affix *m-i-* conveys various meanings, including CARRY, PUT ON, USE, HAVE, etc., and when it attaches to a kinship term, such as *m-i-walrak* 'give birth to a child' < *walrak* 'child', and *m-i-wadi* 'have younger siblings' < *wadi* 'younger sibling', it exhibits rather different properties from those where the nominal stem is a common noun (e.g., *m-i-kiping* 'put on clothes' < *kiping* 'clothes'; *m-i-paisu* 'carry money' < *paisu* 'money'), and it has developed idiosyncratic meanings when they occur in undergoer voice. For example: *m-i-walrak* (AV) 'have a child; give birth to' vs. *pi-walrak-aw* (PV) 'adopt a child'; *m-i-wadi* (AV) 'have a sibling' vs. *pi-wadi-aw* (PV) 'take sb. as a younger sibling'. Examples are given below:

[13] These languages include Atayal (*usa*), Saisiyat ('*osha'*), Seediq (*usa*), Pazih (*usa*), Thao (*usha*), Hoanya (*usa*), Amis (*osa*), and Puyuma (*ua*).

(46) Nanwang Puyuma (Online dictionary)

a. *a* *ma~ina~inayan* *tu=walrak* *aw,* *ma-ranger*
INDF.NOM AV~RED~male 3.PSR.NOM=child and AV-want
m-i-walrakq *dra* *babayan.*
AV-have-child INDF.OBL female
'All her children are boys, and so she wants to give birth to a girl.'

b. *adri* *m-i-walrak* *aw,* *tu=pi-walrak-aw* *i* *Salrebi.*
NEG AV-have-child and 3GEN=have-child-PV SG.NOM Salrebi
'She does not have children, so she adopted Salrebi.'

c. *m-i-wadi=ku* *dra* *mi-a-telu.*
AV-have-younger.sibling=1SG.NOM INDF.OBL HUM-PL-three
'I have three younger brothers.'

d. *uniyan=ku* *dra* *wadi* *dra* *mainayan*
exist.NEG=1SG.NOM INDF.OBL younger.sibling INDF.OBL male
*ku=**pi-wadi-aw*** *i* *Ising.*
1SG.GEN=have-younger.sibling-PV SG.NOM Ising
'I don't have younger brothers, so I take Ising as my brother.'

Interestingly, such an idiosyncratic development (denoting a different meaning in UV clauses) seems to apply only when the nominal stem denotes a 'blood relative', such as *walrak* 'child', *wadi* 'younger sibling', *temama* 'father', *taina* 'mother', *temuwan* 'grandchild'. For nominal stems that denote other kinship relations, such as *kataguin* 'spouse', *asawa* 'son/daughter-in-law', there is no such semantic shift. For instance, in a collection of texts (Teng & Chen 2022) about Katripulr mythology and history, both *m-i-turuma'an* and *pi-turuma'an-aw* are constantly interchanging to depict the marriage relationship.

(47) Katripulr Puyuma (Teng & Chen 2022: 231)
tu=pi-turuma'an-aw=lra, *m-i-turuma'an* *imu,* *tu=lra'et-ay*
3.GEN=have-spouse-PV=PFV AV-have-spouse TOP 3.GEN=bite-LV
za *'utilr.*
INDF.OBL penis
'She got married, she had married, and then she bit (her husband's) penis.'

4.3 DNVs with an independent nominal complement

In Paiwan, there are instances where the independent NP does not act like a modifier (whether with or without an overt noun) nor does it denotes a specific kind of the incorporated nominal stem. In (48a) and (48b), different meanings are obtained in terms of the case markers occurring before the independent NP *sicauvan* 'blanket'.

(48) Paiwan

a. *na=masi-itung=aken* ***tua*** *sicauvan.*
PFV=carry.AV-comforter=1SG.NOM OBL blanket
'I brought a blanket comforter.'

b. *na=masi-itung=aken* *tu* *sicauvan.*
PFV=carry.AV-comforter=1SG.NOM OBL blanket
'I brought a comforter (to be used) as (someone's) blanket.'

The marker *tu* is analyzed as a partitive oblique case marker by Tang et al. (1998), as it mostly occurs before a numeral. From the different translations, the independent NP marked by *tu* does not act like a modifier, but more like a complement. In addition, while *tu* may co-occur with a genitive pronoun, *tua* may not, as shown in (49).

(49) Paiwan

a. **na=masi-itung=aken* *tua* *ku=sicauvan.*
PFV=carry.AV-comforter=1SG.NOM OBL 1SG.GEN=blanket
(Intended for) 'I brought a blanket comforter for my own use.'

b. *na=masi-itung=aken* *tu* *ku=sicauvan.*
PFV=carry.AV-comforter=1SG.NOM OBL 1SG.GEN=blanket
'I brought a comforter (to be used) as my blanket.'

More data are needed to facilitate a unifying analysis.

5. Summary

This paper is a preliminary study of the denominal constructions in Puyuma and Paiwan. Similar constructions have been described as NI in the typological literature. Although DNVs are productive and commonly seen across various Formosan languages, there has been no in-depth

analysis so far except for Chen's (2022) study on Rukai. Issues, that are investigated in this paper, are often related to the study of NIs and DNVs, such as (i) whether the construction involves a "stranding" modifier or a null head, and (ii) whether the phenomenon of "noun doubling" is allowed in a given language. In addition, five subtypes of modifiers are identified. The current study shows that there are restrictions on the acceptance of DNVs with a null head or with doubling noun in terms of the kind of modifier in a given DNV. Restrictions on voice alternations in DNVs are also tackled, and it is found that different factors are involved in the choice of voice in these two languages under study. While the definiteness of the undergoer plays a major role in voice choice in Puyuma, an addition of an extra argument seems to be the deciding factor in voice choice in Paiwan. Finally, in addition to DNVs with an undergoer stem, some other types of stems are also found in Formosan languages, including stems that denote a location, and stems that denote a complement. The semantic relationship between the verbal affix and the nominal stem is thus diverse and this is an area that deserves further study.

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Abbreviations

ACC	accusative
AV	actor voice
CLF	classifier
COS	change of state
CV	conveyance voice
DEF	definite
DEM	demonstrative

DIST	distal
EXCL	exclusive
FUT	future
GEN	genitive
HUM	human
IMP	imperative
IND	indicative
INDF	indefinite
IPFV	imperfective
LNK	linker
LV	locative voice
NEG	negative
NFUT	non-future
NOM	nominative
OBL	oblique
PAST	past
PFV	perfective
PL	plural
PROG	progressive
PSR	possessor
PV	patient voice
RED	reduplication
SG	singular
TOP	topic
UV	undergoer voice

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Structuring interrogative *how*s in Tsou and Amis: A comparative syntax perspective

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This paper investigates the way different senses of interrogative *how* are syntactically realized in two Formosan languages, Tsou and Amis, from a comparative syntax perspective. In English, different interpretations of *how*s consistently surface in the sentence-initial position, *how*s being typically an adverb. In Chinese, *how*s also typically occur as adverbs but are placed in different positions in a structural hierarchy. In Tsou and Amis, on the other hand, *how*s occur invariably as a main verb, though they pattern with distinct complements. Five lines of enquiry are of particular interest. (i) Not only an instrumental *how*, but also a causal *how* might take an agent as its external argument. (ii) An instrumental *how* might trigger restructuring in Amis. (iii) A causal *how* takes an infinitive complement. (iv) The verb associated with a resultative *how* normally undergoes nominalization. (v) An instrumental *how* can be either transitive or intransitive, whereas a resultative *how* and a causal *how* must be intransitive. These findings have far-reaching implications for the typology and theory of *how*-questions.

Keywords: *how*-questions, causal/instrumental/resultative, adverb, verb, complement, nominalization, transitivity, Tsou, Amis

1. Introduction

This paper attempts to investigate the way a variety of interpretations of interrogative *how* are structurally represented in Tsou and Amis from a comparative syntax perspective, with a special focus on the syntactic representations of manner/method *how*, resultative/state *how*, and causal *how*.

Among *wh*-words, *how* entertains the widest variety of interpretations cross-linguistically. This is best illustrated by English. In their reference grammar of English, Huddleston & Pullum (2002: 907–909) report eight distinct grammatical functions of *how*. Semantically, these grammatical functions can be intended for thirteen different senses, eleven of which are interrogative, as illustrated below.

(1) Adjectival predicative complement

a. *How are you (feeling)?* (current attribute)

b. *How was the concert?* (evaluation)

c. *How did you find the seminar?* (evaluation)

(2) Adverbial degree modifier

a. [*How old*] *is your father?* (degree)

b. [*How many*] *children have they got?* (quantity)

c. [*How seriously*] *are they taking his threat?* (degree)

d. *How did you like the concert?* (degree)

(3) Adjunct in clause structure, questioning means

a. A: *How did you get in?* (method)
B: *By climbing through the kitchen window.*

b. A: *How is she going to pay for it?* (method)
B: *By cheque.*

c. A: *How can I remove it?* (method)
B: *With a razor-blade.*

(4) Adjunct in clause structure, questioning manner

a. A: *How did she speak?* (manner)
B: *With a strong French accent.*

b. A: *How does he drive?* (manner)
B: *Rather recklessly.*

(5) Adjunct in clause structure, asking for evidence

a. *How does he know she is going to resign?* (evidence)

b. *How can you be so sure that it was an accident?* (evidence)

(6) Questioning reason in the it-cleft construction, and in the idiom *how come*

a. *How is it you didn't tell me before?* (reason)

b. *How come the fridge is switched off?* (cause)

(7) In the idiom *how about*

I think it's excellent; how about you? (opinion)

Furthermore, Quirk et al. (1985) and van Gelderen (2015) add three more to Huddleston & Pullum's (2002) already long list, namely, resultant state, frequency, yes-no question. Compare:

(8) Resultant state (Quirk et al. 1985: 819)
How does it work?

(9) Frequency (Quirk et al. 1985: 819)
How often do you visit New York?

(10) *"…How would you like to go with us?" "Lord, Massa, you joking. Go with you?…"*

Interestingly, English interrogative *how*s are consistently fronted to sentence-initial position in the surface syntax, regardless of their semantic interpretations.

The prolific polysemy of interrogative *how* is also found in Mandarin Chinese. In light of the Cartography approach developed by Rizzi (1997; 2004) and Cinque (1999), Tsai (2008) identifies three major types of the interpretations of Mandarin interrogative *how*, namely, causal, instrumental, and resultative, and pinpoints each of them on a distinct position in the syntactic structure. The causal *how* is merged in [SPEC, CP] and functions as a *wh*-operator, scoping over the following TP. In contrast, the instrumental *how* is positioned above VP as an adverbial modifier; semantically, it functions as a predicate of the event encoded by the VP. Meanwhile, the resultative *how* is placed under VP as the complement of its verb head; semantically, it is the internal argument of a causative predicate. Consider:

(11) Chinese causal *how* (Tsai 2008: 98)

Zenme	*henshaoren*	*hui*	*qu?*
how	few.people	will	go

'How come few people will go?'

(12) Chinese instrumental *how* (Tsai 2008: 104)

Ni	*hui*	*zenme(-yang)*	*he*	*na-zhong*	*jiu?*
you	will	how(-manner)	drink	which-kind	wine

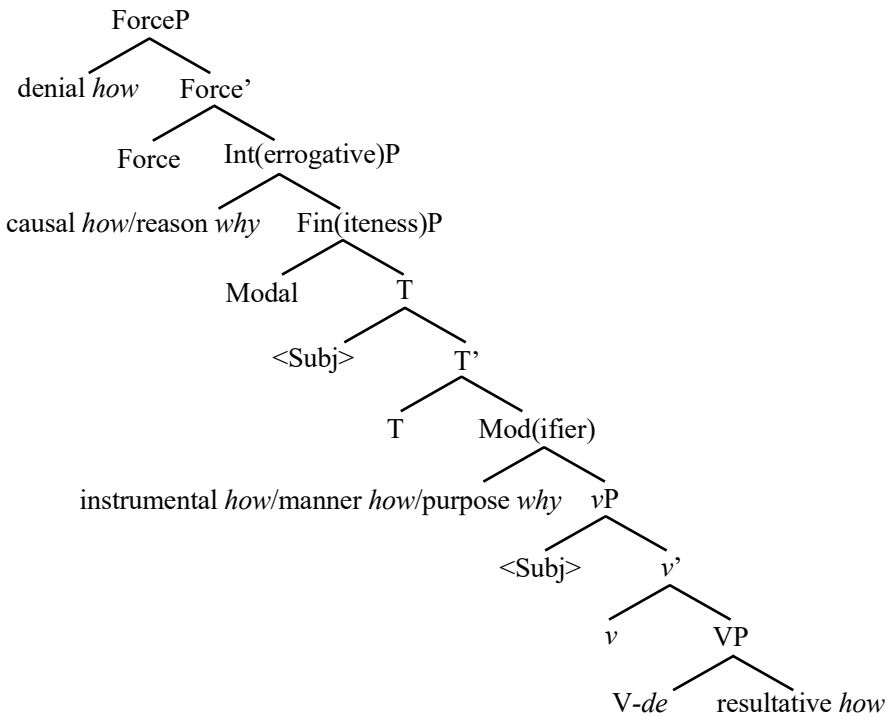
'By what means will you drink which kind of wine?'

(13) Chinese resultative *how* (Tsai 2008: 99)

Zhe-shou	*ge,*	*meigeren*	*dou*	*chang-de*	*zenme-yang?*
this-CLF	song	everyone	all	sing-RES	how-manner

'To what effect did everyone sing?'

(14) Structural hierarchy of *how* in Mandarin (Based on Tsai 2008: 113)



The causal-instrumental-resultative trichotomy in the structural hierarchy in (14) is supported by the fact that the causal *how* precedes a modal verb but the instrumental *how* follows it, whereas the resultative *how* invariably occurs after a lexical verb, as already illustrated in (11–13). In addition, the causal-instrumental-resultative trichotomy is also encoded in the morphological make-up of Chinese *how* to the extent that the resultative *how* must occur with the state morpheme *yang* as *zenmeyang* and the instrumental *how* can occur with or without the state morpheme as *zenme* or *zenmeyang*, while the causal *how* occurs without the state morpheme, hence only as *zenme*.

On the syntactic distribution of interrogative *how*, the comparison between English and Chinese reveals that English *how*s are consistently fronted to sentence-initial position, whereas their Chinese counterparts remain in situ but are placed in various positions according to their respective readings. This instantiates what has been referred to as a typological division between *wh*-movement language (English) versus *wh*-in-situ language (Chinese) (Huang 1982; Tsai 1994; Soh 2005; Cheng 2009). It has been noted in the literature that many Formosan languages are *wh*-in-situ languages (C. L. Chang 1996: 20–25; M. Y. Y. Chang 2000: 2; Tsai & M. Y. Y. Chang 2003: 19; Wei 2009: 322; Tsai 2023). As it will become clear in the subsequent sections, interrogative *how*s also remain in place in Tsou and Amis. Taking this as background information, this paper will be focused on the issues in connection with Tsai (2008). In particular, I shall attempt to answer the following questions:

(15) Research question 1
How is an instrumental *how* syntactically represented in Tsou and Amis? Does an instrumental *how* function as the underlying predicate of an event and surface as an adverb in Tsou and Amis, as in Chinese and English?

(16) Research question 2
How is a resultative *how* syntactically represented in Tsou and Amis? Does a resultative *how* function as an internal argument of a cause predicate and surface as a verbal complement in Tsou and Amis like its Chinese counterpart?

(17) Research question 3
How is a causal *how* sysntactically represented in Tsou and Amis? Does a causal *how* function as an operator and surface as an adverb on the CP-level in Tsou and Amis, as it does in Chinese and English?

As to other issues such as long-distance construal (Collins 1997) and intervention effects (Collins 1997; Rizzi 2004; Tsai 2008), I shall not pursue them here in the interest of productivity and time.

This paper is organized according to the research issues raised above. Previous studies pertinent to each question are discussed in respective sections where they are most relevant. §2 addresses Research question 1 and examines how the instrumental *how* is syntactically realized in Tsou and Amis. §3 attempts to answer Research question 2, pinpointing the syntactic status of the resultative *how* in Tsou and Amis. §4 discusses Research question 3 and explores the issue of the way the causal *how* is syntactically manifested in Tsou and Amis. §5 concludes the paper.

2. Instrumental *how*

Following Tsai (2008), I adopt the term "instrumental *how*" to cover the interrogative readings of method, manner, and means in Tsou and Amis.

2.1 Tsou

In Tsou, there are two *wh*-words for the interrogative method reading. The first one is concerned with the compound verb *tivovona* 'do how', comprised of the lexical prefix *ti-* 'do with one's hands' and the motion interrogative bound root *-vovonx* 'go where'. For instance:

(18) Tsou

La-ko	*tivovon-a*[1]	*ho*[2]	*mi-su*	*moyoyai*	*yungku?*
HAB-2SG.ERG	do.how-TR	CONJ	RLS.INTR-2SG.ABS	make	basket

'How do you make the basket?' (Context: The speaker watches the addressee making baskets.)

As in (18), the method interrogative *tivovona* is inflected for transitive voice and occurs as a main verb, led by the habitual auxiliary *la*, with the lexical verb describing the event occurring in a conjunct headed by the conjunction *ho*. This is consistent with Tsai & M. Y. Y. Chang's (2003) description of the instrumental interrogative in Tsou. Nevertheless, conjunction is not obligatory; the lexical verb describing the event may undergo nominalization and occur as the subject of *tivovona* if the event is intended for a generic activity. Compare:

(19) Tsou

La-ko	*tivovon-a*	*na*	*hia-su*	*moyoyai*	*yungku?*
HAB-2SG.ERG	do.how-TR	ABS	NMLZ-2SG.POSS	make	basket

'How do you make a basket in general?'

As in (18–19), it is the transitive form *tivovona* rather than its intransitive counterpart *tivovonx* that is used for the method interrogative sense, revealing a transitive preference for a method *how* in Tsou. Note that the intransitive *tivovonx* is not categorically ruled out for the method

[1] In the ergative theory adopted in this paper, the Actor Voice (AV) is treated as grammatically intransitive and Non-Actor Voice (NAV) as transitive.

[2] *Ho* is glossed differently among various examples due to different syntactic functions.

reading; rather, its occurrence is highly restricted. My language consultant informs me that in the case of the intransitive *tivovonx*, the agent of the event must co-occur with the lexical verb specifying the event rather than with the interrogative verb asking the question. Compare:

(20) Tsou

a. *La* *tivovonx* *ho* *mi-su* *moyoyai* *yungku?*
HAB do.how.INTR CONJ RLS.INTR-2SG.ABS make basket
'How do you make a basket?'

b. **La-ko* *tivovonx* *ho* *mi-su* *moyoyai* *yungku?*
HAB-2SG.ABS do.how.INTR CONJ RLS.INTR-2SG.ABS make basket
Intended: 'How do you make the basket?'

There seems to be a subtle semantic difference between (20a) and (18). According to my language consultants, the object is specific in (18) but nonspecific in (20a). Note also that either *tivovona* or *tivovonx* is usually associated with an activity performed by hands, given their shared manual prefix *ti-*.

The second *wh*-word for the method interrogative reading is concerned with *mainenu*/*yainenu*, consisting of the similarity prefix *mai-* 'to be like' and the place interrogative pronoun *nenu* 'where'. Complementing *tivovona*/*tivovonx*, *mainenu*/*yainenu* is used for questioning non-manual activity. Still, as in the case of *tivovona* versus *tivovonx*, *yainenu* is better accepted than its intransitive counterpart *mainenu* for the method interrogative reading. Consider:

(21) Tsou

Te-ko *yainenu* *ho* *pei'i* *'e* *yoskx?*
IRR-2SG.ERG do.how.TR COMP cook.TR ABS fish
'How will you cook the fish?'

The transitive preference is also found with its means or instrumental reading. For example:

(22) Tsou

Te-ko *yainenu* *ho* *peyahufa* *ho* *mo* *uk'a* *f'uhu?*
IRR-2SG.ERG do.how.TR COMP peel.off.TR SUB RLS.INTR not.exist knife
'How can you peel off the palm tree without a knife?'

However, the transitive preference does not hold of the manner reading of *mainenu*/*yainenu*. As shown in (23) below, *mainenu* is perfectively fine with the manner reading.

(23) Tsou

La-ko	*m-ainenu*	*ho*	*mi-su*	*miusnu*	*ta*
HAB-2SG.ABS	INTR-do.how	CONJ	RLS.INTR-2SG.ABS	go.towards	OBL

'o'oko	*ho*	*aomotx'x?*
children	CONJ	talk

'How do you talk to children?'

The following observations sum up the preceding presentations on method/instrumental/manner *wh*-words in Tsou:

(i) **Main verb**: Method/instrumental/manner *how* is a main verb. It occurs as the first conjunct of a clausal coordination, with the event it modifies expressed in the second conjunct. For the method interrogative encoding something done by hand, the modified event may be expressed without coordination, as a DP subject of *how*.

(ii) **Transitive preference**: Except for the manner reading, an instrumental *how* prefers to occur as transitive in the first conjunct, with the lexical verb describing the event being also transitive in the second conjunct;

(iii) **Taking agent**: An instrumental *how* may pattern with an agent in its clause.

Among the examples given above, the sentence in (18) (repeated as (24a) below) represents these properties most faithfully, as can be seen in the following diagram (24b):

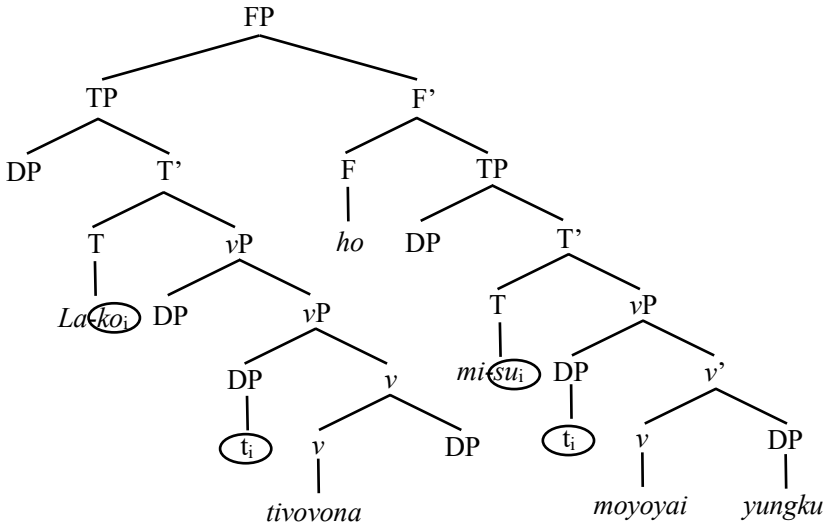
(24) Tsou

a.

La-ko	*tivovon-a*	*ho*	*mi-su*	*moyoyai*	*yungku?*
HAB-2SG.ERG	do.how-TR	CONJ	RLS.INTR-2SG.ABS	make	basket

'How do you make the basket?'(Context: The speaker watches the addressee making baskets.)

b.



This contrasts with Tsai & M. Y. Y. Chang's (2003) analysis of Tsou manner/method/means *wh*-questions. In their framework, a manner/method/means *wh*-word is taken as the predicate of an underlying event in the sense of Parsons (1990). However, their analysis might run into problems with *wh*-questions such as (18=24a) where the agent undertaking the event occurs both with the interrogative verb and the lexical verb and that the two occurrences are marked with distinct cases—the first one with the ergative and the second one with the absolutive. A raising analysis of the agent argument might step in to rescue but that measure turns out to be too risky. After all, the second conjunct in question (a finite clause) is supposed to be a syntactic island that would bar any DP from extracting from there. In addition, the proposed raising is also without any syntactic motivation at all, given that the (second) agent argument has already received a structural case in its alleged extraction site. It is unnecessary for the agent to move from the second conjunct to the first one and, even more purposelessly, to obtain another (distinct) case in its alleged landing site. I thus maintain that the occurrence of the agent in the first conjunct should be base-generated in rather than raised to the first conjunct. In this regard, Tsou instrumental *wh*-expressions differ significantly from their English/Chinese counterparts not only in their syntactic representations but also in their lexical selection.

It is also noted that the event associated with an instrumental interrogative verb may occur in various forms in Tsou: it may appear either as a full finite clause in the conjunction, as already illustrated in (18=24a), a nominalized DP in the subject position, as in (19), or a *v*P in the complement clause, as in (21–22). The variation might suggest that Tsou instrumental *wh*-questions be on the way of grammaticalization. This is beyond the scope of this paper and merits a future investigation.

2.2 Amis

As in Tsou, a method interrogative also occurs as a main verb in Amis, evidenced by the fact that it is led by the tense particle and the fact that it is eligible for transitive voice inflection. Consider:

(25) Amis (Based on Lin 2015: 266)

Na	*maan-en*	*ni*	*Panay*	*mi-padang*	*kisu?*
PST	do.how-TR	ERG	PN	INTR-help	2SG.ABS

'How did Panay help you?'

However, unlike Tsou, a method interrogative verb takes as its complement the constituent headed by the lexical verb describing the event. In addition to the intervening complementizer, other morpho-syntactic properties also suggest the verb-complement relationship between the method interrogative and the lexical verb. First, the agent of the event surfaces as the external argument of the interrogative verb in the higher clause rather than remain with the lexical verb downstairs. Compare:

(26) Amis (Based on Lin 2012: 198)

a.

Maan-en	*ni*	*Panay*	*(a)*	*mi-padang*	*ku-ya*	*wawa?*
do.how-TR	ERG	PN	COMP	INTR-help	ABS-that	child

'How will Panay help the child?'

b.

**Maan-en*	*(a)*	*mi-padang*	*ci-Panay*	*tu*	*wawa*
do.how-TR	COMP	INTR-help	NCM-PN	OBL	child

Intended: 'How will Panay help the child?'

Second, the lexical verb specifying the event is highly restricted in its voice inflection when coming after an interrogative verb inflected for transitive voice. Compare:

(27) Amis (Based on Lin 2012: 198)

a.

Maan-en	*ni*	*Panay*	*(a)*	*mi-padang*	*ku-ya*	*wawa?*
do.how-TR	ERG	PN	COMP	INTR-help	ABS-that	child

'How will Panay help the child?'

b.

**Maan-en*	*ni*	*Panay*	*padang-en*	*ku-ya*	*wawa?*
do.how-TR	ERG	PN	help-TR	ABS-that	child

Intended: 'How will Panay help the child?'

Importantly, as noted by Lin (2012: 197; 2015: 260) and Wu (2018: 104), upon the method question reading, an interrogative verb is required to be transitively marked; in other words, unlike Tsou, the matter under discussion turns out to be a categorical mandate rather than merely an optional preference in Amis. I have exemplified this (25) through (27) above in terms of the plain transitive *maanen*. A few examples of transitive interrogative verbs other than *maanen* are given in (28a–b) below.[3]

(28) Amis ((28a) is based on Rata 2019: 357; (28b) is based on Rata 2019: 666)

a. *Sa-maan-en* *no* *mita* *ko* *tayal?*
SA-do.how-TR GEN 1PL.GEN ABS work
'How may we do with this task?'

b. *Sa-maan-en* *haca* *a* *miliyaw* *kora* *loma',* *kaherekan=to* *a* *patireng.*
SA-do.how-TR again LNK change that.ABS house finish=PRF LNK build
'How to fix the house that has already been built?'

This contrasts sharply with the intransitive interrogative verbs.[4] As in (29a–b), the intransitive interrogative verb *mimaan* has an activity reading and the intransitive interrogative verb *mamaan* has a state reading—neither of them is intended for an instrumental sense.

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[3] It seems that the transitive interrogative verbs marked with *sa-* and those without *sa-* do not exactly have the same meaning. My preliminary observation is that the former carry an additional sense of speaker's doubt. A further investigation along this line of thought is desirable.

[4] It should be pointed out, however, that interrogative verbs marked with the applicative-activity prefix complex *sapi-* are intended for a purposive rather than instrumental reading. Compare:

(i) Amis (Based on Rata 2019: 357)
O *sa-pi-maan* *ko* *matira-ay* *mapohed-a* *a* *kilang?*
O SA-PI-do.how ABS like.that-RLS rotten-RLS LNK tree
'What can rotten wood be used for?'

(29) Amis ((29a) is based on Rata 2019: 30; (29b) is based on the online dictionary)[5]

a. *Mi-maan* *kiso* *a* *maro'* *i* *cani'iw* *no* *loma'?*
INTR-do.how 2SG.ABS LNK sit LOC corner POSS house
'How come you sit on the corner of the house?'

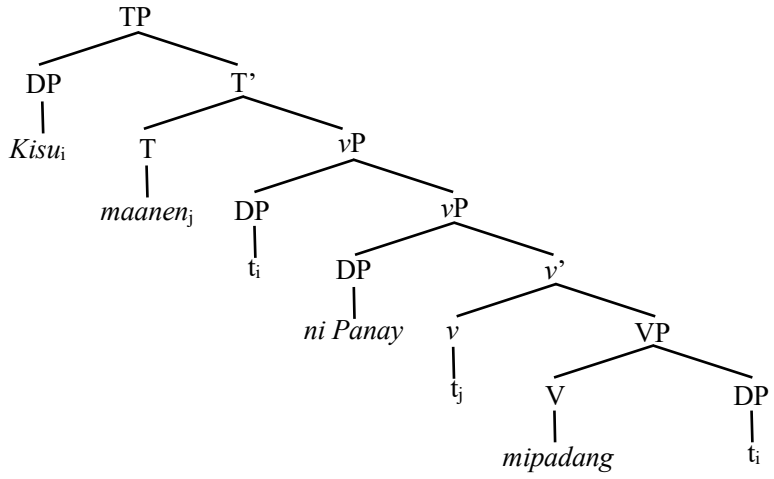
b. *Ma-maan* *ko* *faloco'* *no* *miso?*
INTR-do.how ABS heart POSS 2SG.POSS
'How is your heart?' ('What's the status of your heart?')

In summary, the instrumental *how* exhibits the following important grammatical properties in Amis:

(i) **Main verb**: An instrumental *how* occurs as a main verb;
(ii) **Complement verb restriction**: The lexical verb following an instrumental *how* can only appear in its intransitive AV form;
(iii) **Transitive requirement**: An instrumental *how* is required to be transitively marked;
(iv) **Agent-taking**: An instrumental *how* takes an agent as its external argument.

Taking (25) for example, I can diagram the instrumental reading of an interrogative *how* in Amis roughly as follows:

(30) Diagram for (25)



[5] https://e-dictionary.ilrdf.org.tw

As in (30), the instrumental *maanen* receives a transitive marking and occurs as the predicate of the main clause; it takes an agent as its external argument and a VP as its complement. Note that on this reading, the interrogative verb *maanen* behaves like a restructuring verb and thus (i) *maanen* controls the argument arrangement of the sentence, and (ii) the verb in the embedded clause loses its case-assignment capacity, and (iii) the embedded object is required to be raised upward to get a structural case. Put in a wider context, this is consistent with what has been observed in the restructuring literature (Wurmbrand 2001, 2013; Chang 2017; Shih 2017). A restructuring verb is known to be of a subject-control verb—it takes an external argument and an infinitive complement but lacks a direct object. Interrogative verbs such as *maanen* might be a verb of that sort. A similar analysis is presumably carried over to *samaanen*. It is noteworthy that under the restructuring analysis, the agent of the event is based-generated with the interrogative verb instead of being raised from the embedded clause.

The transitivity requirement is outstanding. Recall that a transitive form of an interrogative *how* intended for an instrumental reading is preferred instead of required in Tsou. Nevertheless, this turns out to be mandatory in Amis. The motivation for this requirement deserves further enquiry.

2.3 Cross-linguistic comparison

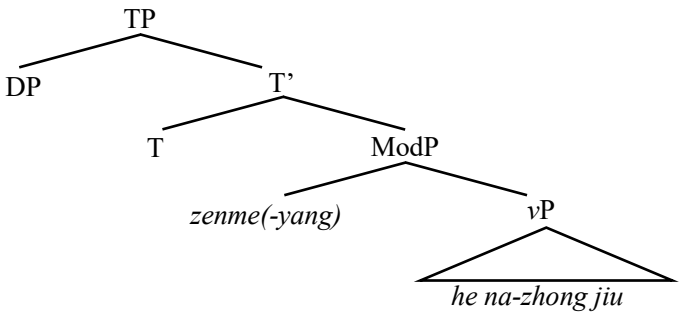
Following Parsons (1990), Tsai (2008) takes an instrumental *how* as the predicate of an underlying event. As mentioned above (see §2.1), a similar analysis is adopted in Tsai & M. Y. Y. Chang (2003) for Tsou. Syntactically, a Chinese instrumental *how* is taken as an adverb base-generated right above *v*P in Tsai (2008). For example:

(31) Chinese (Tsai 2008: 104)

Ni	*hui*	*zenme(-yang)*	*he*	*na-zhong*	*jiu?*
you	will	how(-manner)	drink	which-kind	wine

'By what means will you drink which kind of wine?'

(32) Syntactic structure of (31) (Based on Tsai 2008: 113)



Based on the Tsou and Amis data presented above in §2.1 and §2.2, I believe that the first part of Tsai's analysis, namely, his analysis of the instrumental *how* as a semantic predicate, is tenable. Recall that an instrumental *how* in Tsou and Amis can take both an external argument and an internal clausal argument on a par with a two-place predicate. Its predicative status should be beyond question. Meanwhile, I am hesitant to adopt the second part of Tsai's analysis, viz., his analysis of an event as the sole argument (i.e., the subject) of an instrumental *how*. Note that the agent involved in the event serves as the external argument of the instrumental *how* in Tsou and Amis. It is by no means possible that the agent is moved from the embedded clause to the matrix clause, as argued above. This casts doubt on the sole argument (subject) analysis. It is more likely, at least, as far as Tsou and Amis are concerned, that the verbal instrumental *how* is a two-place predicate, taking an agent as its external argument, and an event as its internal argument, as schematized in (28).

(33) The argument structure of an instrumental *how* in Tsou and Amis
do.how (agent, event)

This analysis can naturally account for the typological differences mentioned above. As shown in the preceding sections, the instrumental *how* is realized as a distinct grammatical category in different languages: it surfaces as an adverb in English and Chinese, but as a main verb in Tsou and Amis; it does not take an infinitive complement in English and Chinese, but it does so in Amis; it is not inflected for voice in English and Chinese, but displays voice alternations in Tsou and Amis; it does not take an agent as its external argument in English and Chinese, but does so in Tsou and Amis. Of particular interest is that the instrumental *how* behaves like a restructuring predicate and triggers the movement of the embedded object to the matrix clause. This typological feature merits more attention.[6]

[6] Meanwhile, an anonymous reviewer brings to my attention that the two-argument analysis in (33) might run into a problem in cases where the event associated with an instrumental *how* is expressed as a conjunct, as in the Tsou

3. Resultative *how*

In light of Tsai (2008), I use the term resultative *how* to subsume a variety of readings concerning state, including resultative, current attribute, opinion, etc.

3.1 Tsou

In Tsou, a resultative *how* typically occurs as a main verb, predicated of a DP subject, which can be a simple DP, as in (32a), or a complex DP consisting of a syntactically nominalized verb describing the event involved, as in (32b).

(34) Tsou

a. *Mi-su* *m-ainenu* *maitan'e?*
RLS.INTR-2SG.ABS INTR-do.how today
'How are you doing today?

b. *Mo* *m-ainenu* *na* *hia-su* *tosvxtx?*
RLS.INTR INTR-do.how ABS NMLZ-2SG.POSS test
'How are your tests going?'

Unlike an instrumental *how*, a resultative *how* is not eligible for transitive voice. Compare:

(35) Tsou

a. **I-ko* *yainenu* *maitan'e?*
RLS.TR-2SG.ERG do.how.TR today
Intended: 'How are you doing today?'

b. **Os-ko* *yainenu* *na* *hia-su* *tosvxtx?*
RLS.TR-2SG.ERG do.how.TR ABS NMLZ-2SG.POSS test
Intended: 'How are your test going?'

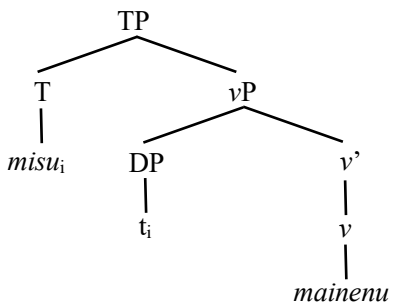
example (24). This is indeed a problem. I have no ready answer for it and will leave this issue for future research. I maintain my analysis because I believe that an instrumental *how* must hold a semantic relation to the event associated with it, no matter of how they are syntactically realized.

In summary, the resultative *how* in Tsou exhibits the following grammatical properties:

(i) **Main verb**: The resultative *how* occurs as a main verb, taking a DP as its subject/topic;
(ii) **Intransitive requirement**: The resultative *how* must be intransitive;
(iii) **Syntactic nominalization**: The lexical verb specifying the event associated with the resultative *how* may be led by a syntactic nominalizer *hia*.

Unlike the instrumental *how*, the resultative *how* occurs as a one-place predicate, taking an agent/experiencer as its sole argument in Tsou. In this view, the sentence in (34a) can be roughly diagrammed as follows:

(36) Syntactic structure of (34a)



3.2 Amis

In Amis, an interrogative expressing current attribute also occurs as a main verb, taking a DP as its subject. Of particular interest is that the state sense of a resultative *how* is overtly marked by the intransitive state prefix *ma-* in Amis. For instance:

(37) Amis ((37a) is based on Wu 2018: 104; (37b–c) are based on the online dictionary)

a. *Ma-sa-maan* *ko* *romi'ad* *anini?*
INTR-SA-do.how ABS weather today
'How is the weather today?'

b. *Ma-maan* *ko* *faloco'* *no* *miso?*
INTR-do.how ABS heart POSS 2SG.POSS
'How is your heart?' ('What's the status of your heart?')

c. *Ma-maan-ay* *kiso,* *mana* *makodic?*
INTR-do.how-RLS 2SG.ABS MANA got.skin.disease
'How are you (What is wrong with you)? Why did you contract the skin disease?'

The intransitive state-marking interrogative verb *mamaan* is also employed to question the resultant state following from an action. In this use, the subject DP predicated of by *mamaan* is comprised of an event-denoting verb that has undergone nominalization. Compare:[7]

(38) Amis (Based on Wu 2018: 104)
Ma-sa-maan *ko* *ni-pa-hecek-an* *namo* *a* *tartar.*
INTR-SA-do.how ABS NMLZ-CAUS-do.piling-NMLZ 2PL.GEN COMP pile
'How are you doing piling?'

In the sense of asking opinion, the resultative *how* also occurs as the main predicate of the sentence. For instance:

(39) Amis ((39a) is based on Rata 2019: 356; (39b) is based on Rata 2019: 502)
a. *Ma-maan* *saw?*
INTR-do.how Q
'How about (this)?'
b. *Ma-maan* *mapa-padang* *kita* *to* *tayal?*
INTR-do.how RECP-help 1PL.ABS OBL work
'How about us helping each other in work?'

To sum up, the resultative *how* in Amis exhibits the following morpho-syntactic properties:

(i) **Main verb**: The resultative *how* occurs as a main verb, predicated of a subject DP;
(ii) **Intransitive state-marking**: The resultative *how* is consistently prefixed with the intransitive state marker *ma-*;
(iii) **Nominalization**: The lexical verb specifying the event associated with a resultative *how* is typically nominalized.

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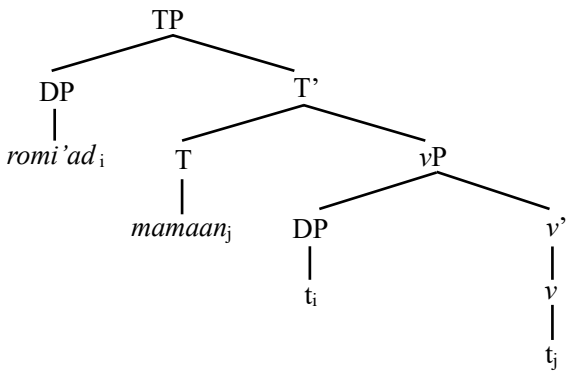
[7] On the other hand, *mamaan* can also encode a question asking for opinion. Consider:

(i) Amis (Based on Wei 2009: 333)
Ma-maan *mi-'usi* *tu* *tilid?*
INTR-do.how INTR-read OBL book
'How about reading some books?'

On (37a), the resultative *how* entertains the following phrase structure:

(40) Syntactic structure of (37a)



A similar structural representation can carry over to sentences like (38). However, this cannot accommodate sentences such as (39b), where the resultative *how* is followed by a regular (non-nominalized) clause. I leave this for future research.

3.3 Cross-linguistic comparison

From the preceding discussions, I show that a resultative *how* behaves more uniformly than its instrumental counterpart in that it occurs as a syntactic predicate cross-linguistically. A resultative *how* occurs as a predicate even in English and Chinese, though their instrumental and causal *how*s function as adverbs.[8] Still, the resultative *how* in Tsou and Amis differ from their Chinese and English counterpart in syntactic structure. As hinted in Tsai (2008), the resultative *how* might occur as a secondary predicate in Chinese. Consider:

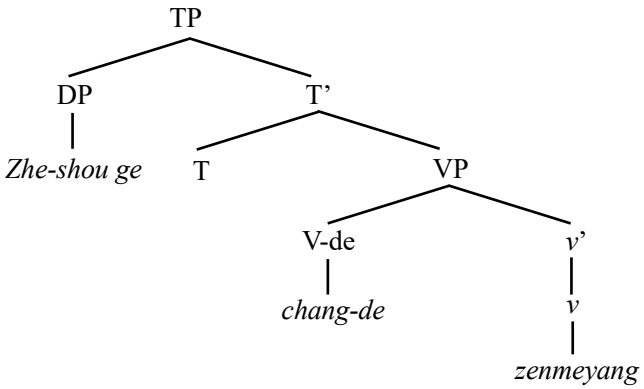
(41) Chinese (Tsai 2008: 99)

Zhe-shou	*ge,*	*meigeren*	*dou*	*chang-de*	*zenme-yang?*
this-CLF	song	everyone	all	sing-RES	how-manner

'To what effect did everyone sing?'

[8] Recall that a resultative *how* is described as "an adjectival predicative complement" in English grammar (Huddleston & Pullum 2002: 907), as already mentioned in §1.

(42) Syntactic structure of (41) (Based on Tsai 2008: 113)



By contrast, the resultative *how* surfaces as a main predicate rather than a secondary predicate in Tsou and Amis.

4. Causal *how*

4.1 Tsou

In Tsou, a causal *how* also occurs as a main verb, taking as its complement a nonfinite clause it operates on. For instance:

(43) Tsou

a. *Mi-ta=s'a* *m-ainenu* *'e* *Mo'o* *ci* *o'te* *an-a*
RLS.INTR-3SG.ABS=S'A INTR-do.how ABS PN COMP NEG eat-TR
'e *yoskx?*
ABS fish
'How come Mo'o did not eat the fish?'

b. *Mi-su=s'a* *m-ainenu* *ci* *o'te* *an-a* *'e* *yoskx?*
RLS.INTR-2SG.ABS=S'A INTR-do.how COMP NEG eat-TR ABS fish
'How come you did not eat the fish?'

As in (43), the complement clause following *mainenu* is headed by a complementizer *ci*. This should not be confused with a relative clause. In a relative clause, the particle *ci* after *mainenu* serves as a relativizer instead of a complementizer and that *mainenu* inside the relative clause is intended for a attributive reading rather than a causal reading. Compare:

(44) Tsou (Based on Weber et al. 2012: 284)

I-ko	*ta'unano*	*mi-ko*	*m-ainenu*	*ci*	*yatatiskova?*
RLS-2SG.ERG	consider.TR	RLS-2SG.ERG	INTR-do.how	RELZ	person

'Whom makest thou thyself?' ('What do you make of yourself?') (Joh 8:53)

It should be also noted that a causal *mainenu* may accommodate an agent in the same clause, as expressed by the bound pronouns *-ta* and *-su* and the free morpheme *Mo'o* in (43). One might take the agent as raised from the embedded clause, given that the agent is semantically associated with the embedded activity verb and that the complement clause is nonfinite. The raising analysis is, however, doubtful, for two reasons. First, that would violate the one-case constraint—a case chain has but one case, and only one. Note that the agent is in the absolutive case and that it should be in the ergative case in the alleged extraction site. Second, that would violate the locality constraint. Pay special attention to (43a). How could the agent *Mo'o* overtake the direct object *yoskx*, which is structurally higher than it, and be raised from the complement clause without evoking the locality effect? I would not adopt the raising analysis unless more solid evidence for it is provided. At this point, I would take the agent as base-generated with a causal *mainenu*.

Like a resultative *nainenu*, a causal *mainenu* is ineligible for transitive voice in Tsou. Consider:

(45) Tsou

a. **I-ta=s'a yainenu ci o'te cmx'ho nehucma?*

RLS.TR-3SG.ERG=S'A do.how.TR COMP NEG come.INTR yesterday

Intended: 'How come he did not come yesterday?'

b. **Os-ko=s'a yainenu ci o'te ana 'e yoskx?*

RLS.TR-2SG.ERG=S'A do.how.TR COMP NEG eat-TR ABS fish

'How come you did not eat the fish?'

It should be pointed out that the complement embedded under a causal *mainenu* is a reduced nonfinite clause, as evidenced by the fact that the complement clause cannot be led by a finite auxiliary. Consider the following examples (46) to the above examples (43):

(46) Tsou

a. **Mi-ta=s'a* *m-ainenu* *ci* *mi-ta* *o'te*
RLS.INTR-3SG.ABS INTR-do.how COMP RLS.INTR-3SG.ABS NEG
cmx'ho *nehucma?*
come.INTR yesterday
Intended: 'How come he did not come yesterday?'

b. **Mi-su=s'a* *m-ainenu* *ci* *i-ko* *o'te* *a-na*
RLS.INTR-2SG.ABS INTR-do.how COMP TR-2S.ERG NEG eat-TR
'e *yoskx*
ABS fish
Intended: 'How come you did not eat the fish?'

Given the lack of finite marking in the complement, temporal information of the activity might be encoded somewhere else. In (47) below, the temporal information of the activity is marked by the auxiliary in the deeply embedded complex DP: the realis auxiliary *mo* indicates the activity already taking place prior to the speech time, whereas the irrealis auxiliary *te* specifies the activity taking place after the speech time.

(47) Tsou

a. *Mi-su* *m-ainenu* *ci* *uh-to* *mo* *pemo?*
RLS.INTR-2SG.ABS INTR-do.how COMP get.to-OBL RLS.INTR go.to.banquet
'How come you went to the banquet?'

b. *Mi-su* *m-ainenu* *ci* *uh-to* *te* *pemo?*
RLS.INTR-2SG.ABS INTR-do.how COMP get.to-OBL IRR go.to.banquet
'How come you will go to the banquet?'

The main verb analysis also holds true of a causal *mainenu* that takes a reduced clause without involving an agent. Compare:

(48) Tsou

Mo *m-ainenu* *ci* *na'no* *kuoonga* *si* *cmxcmx?*
RLS.INTR INTR-do.how COMP very dark ABS cloud
'How come the cloud becomes so dark?'

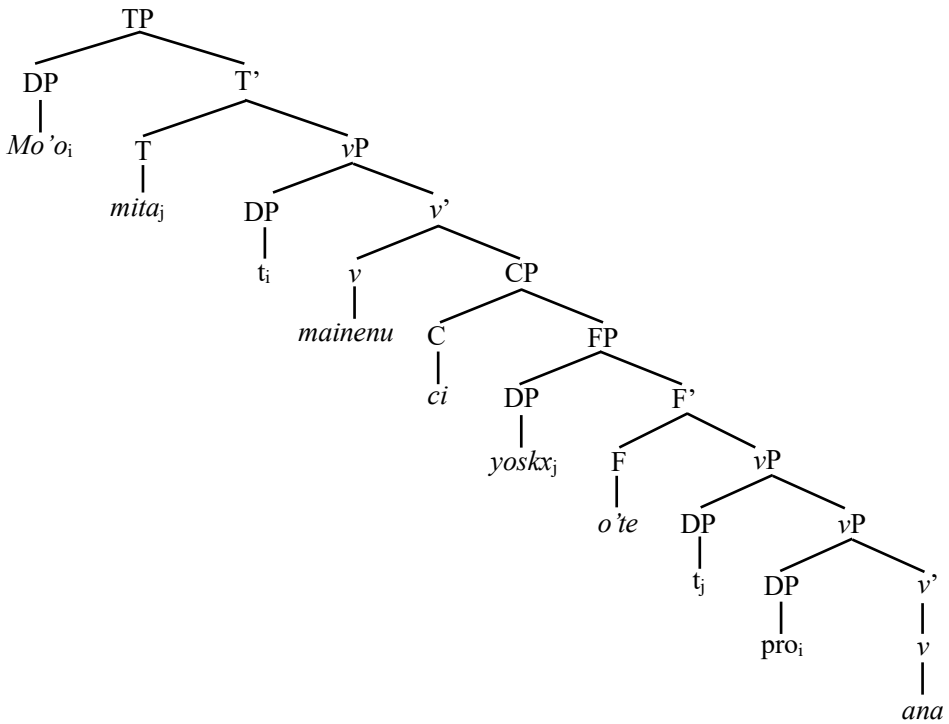
To sum up, a causal *how* in Tsou has the following grammatical properties:

(i) **Main verb**: A causal *how* occurs as a main verb, taking as its complement the clause it operates on;
(ii) **Intransitive requirement**: A causal *how* must be intransitive;
(iii) **Taking agent**: A causal *how* can take an agent as its argument, which is co-referential with the agent of the event associated with it;
(iv) **Nonfinite complementation**: The complement clause that a causal *how* takes is a reduced nonfinite clause (headed by the complementizer *ci*).

Take (43a) for example. The syntactic structure of a sentence involving a causal *how* in Tsou can be diagramed as (49).

Incidentally, remnant movement of T' and F' would place the constituent other than the absolutive argument in the focus position above it.

(49) Syntactic structure of (43a)



4.2 Amis

In Amis, a causal *how* occurs as a main verb, taking as its complement a nonfinite clause (Lin 2011: 111, 118). For example:

(50) Amis (Based on Rata 2019: 30)

Mi-maan	*kiso*	*a*	*maro*	*i*	*cani'iw*	*no*	*loma'?*
INTR-do.how	2SG.ABS	LNK	sit.INTR	LOC	corner	POSS	house

'How come you sit on the corner of the house?'

As shown in (50), a causal interrogative verb is prefixed with the intransitive marker *mi-* and surfaces as a matrix verb, with the verb phrase that represents the event occurring as its complement. Note that in this case, the interrogative verb and the lexical verb are intervened by a particle *a*, a linker that is also used to introduce a serial complement (Wu 2018), indicating that the complement in question should be a nonfinite complement. Unlike an instrumental *how*, a causal *how* may pattern with a transitive verb in Amis, as indicated below:

(51) Amis (Based on Rata 2019: 149)

Na-mi-maan	*kora*	*wawa*	*iro*	*ma-palo*	*no*	*ina?*
PST-INTR-do.how	that.ABS	child	IRO[9]	TR-hit	ERG	mother

'How come that child was hit by his/her mother?'

An immediate question arises. Are the arguments associated with the causal *how* (*kiso* in (50) and *kora wawa* in (51)) base-generated in the matrix clause or derived from the complement clause? This is not an easy question and deserves further study. At this point, I favor the base-generation analysis over the movement analysis in that the causal interrogative verb *mimaan* carries the lexical meaning of 'do what', suggesting that it s-selects an agent. Under this view, not only *kiso* in (50) but also *kora wawa* in (51) function as an agent – literally, the sentence in (51) asks what the child did so that he was hit by his mother – it would play as an agent in the matrix clause but a patient in the complement clause.

[9] The function of this element remains to be worked out.

Another way of expressing the causal *how* in Amis is through the use of an interrogative state verb *mamaan*. Compare:

(52) Amis (Based on Rata 2019: 149)

Ma-maan	*kamo*	*iro*	*mi-saforikarikat*	*to*	*mata?*
INTR-do.how	2PL.ABS	IRO	INTR-blink	OBL	eye

'How come you keep blinking?'

It is noteworthy that the causal *how* is consistently intransitive, either as a dynamic *mimaan* or a stative *mamaan*; its transitive counterpart *maanen* is not legitimate for the causal sense. Compare:

(53) Amis

a. **Maan-en ni Panay (a) mi-ala tora impic?*

do.how-TR GEN PN LNK INTR-take that.OBL pencil

Intended: 'How come Panay took the pencil?'

b. *Maan-en ni Panay (a) ma-ala kora impic?*

do.how-TR GEN PN LNK TR-take that.ABS pencil

Intended: *'How come Panay took the pencil?'

To sum up, a causal *how* in Amis has the following grammatical properties:

(i) **Main verb and agent-taking**: A causal *how* may take an agent as its argument; The causal *how* occurs as a main verb, taking as its complement the clause it operates on;

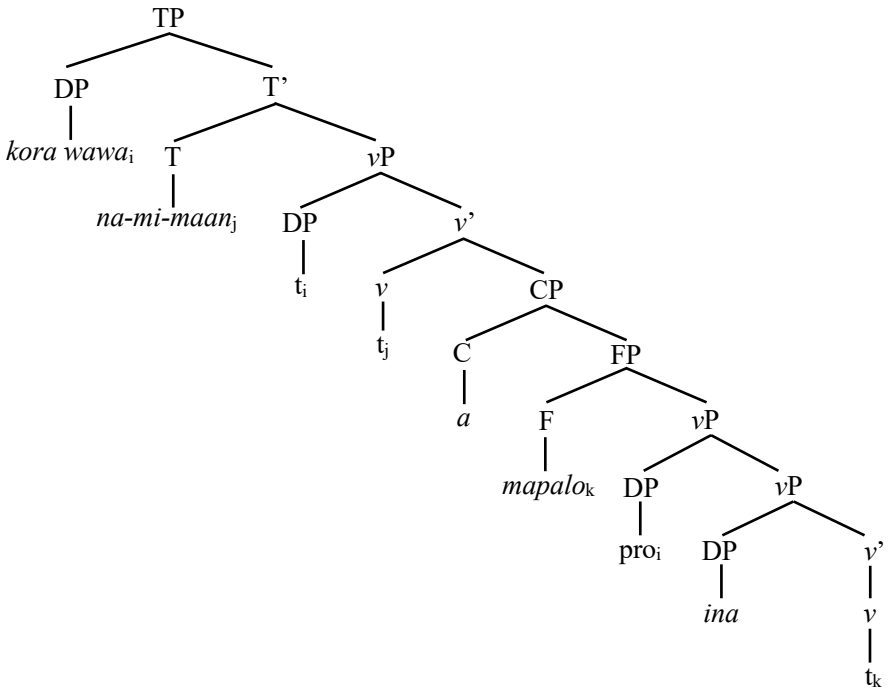
(ii) **Intransitive requirement**: A causal *how* must be intransitive;

(iii) **Nonfinite complementation**: The complement clause a causal *how* takes is a reduced nonfinite clause, (possibly led by an infinitive marker *a*);

(iv) **Transitive complement possible**: A causal *how* might either take a transitive or intransitive complement.

These properties can be largely exemplified by the syntactic representation of (54), with irrelevant points aside:

(54) Syntactic structure of (51)

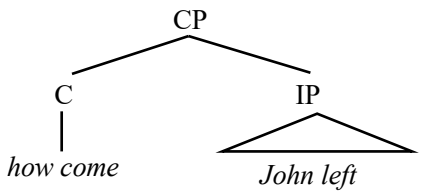


4.3 Cross-linguistic comparison

It has been widely accepted in the literature that a causal *how* is merged as a *wh*-operator in the CP domain. In English, for example, a causal *how* is usually placed in the C:

(55) A causal *how* in English (Collins 1991: 32)
<u>*How come*</u> *John left?*

(56) Syntactic structure of (55) (Based on Collins 1991: 33)



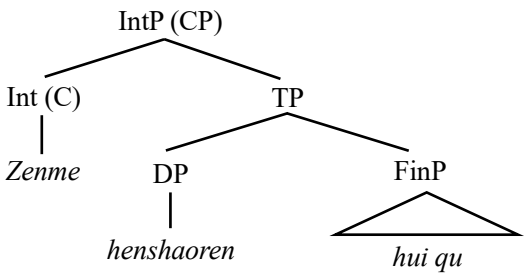
Likewise, a causal *how* is also merged in the interrogative C in Chinese. Consider:

(57) A causal *how* in Chinese (Tsai 2008: 98) (=(11))

Zenme	*henshaoren*	*hui*	*qu?*
how	few.people	will	go

'How come few people will go?'

(58) Syntactic structure of (57) (Based on Tsai 2008: 113)



Tsou and Amis are different in this regard. As shown above, a causal *how* occurs as a main verb in Tsou and Amis instead. It follows that unlike English and Chinese, a causal *how* is placed under (instead of above) a tense/modal head in these languages. Two more differences have also been already mentioned in the proceeding sections. One is that a causal *how* may take an agent in Tsou and Amis. The other one is that a causal *how* takes an infinitive rather than finite complement in Tsou and Amis.

5. Concluding remarks

It becomes evident that unlike English and Chinese, an interrogative *how* occurs as a main verb rather than a complementizer in Tsou and Amis. This accords with previous studies (C. L. Chang 1996; Huang et al. 1999; Tsai & M. Y. Y. Chang 2003; Lin 2015, among others). This paper goes one step further though and explores how the categorical difference impacts the grammar of Tsou and Amis, as discussed in detail below.

5.1 The morphology and distribution of *how*

I have shown that an interrogative *how* may take transitive/intransitive markings on a par with a verb and appears right after a tense/modal element in Tsou and Amis.

5.2 Agent-taking

As noted in Lin (2015) and Wu (2018), an interrogative *how* is derived from an interrogative 'what' plus an event-denoting prefix in Amis; in other words, an interrogative verb 'do how' comes from 'do what'. Although no such a derivation seen in Tsou, a Tsou interrogative *how* is likely to also bear eventuality lexically, hence glossed as 'do how' in the preceding sections. Recall, in particular, the instrumental *how tivovonx/tivovona* is prefixed with a morpheme of manual action. It is thus no surprise that an interrogative *how* may "surprisingly" take an agent in Tsou and Amis. This does not mean that a raising analysis of arguments is to be completely ruled out; instead, this means that a base-generation analysis is empirically more favorable than its raising alternative. Further investigations of these issues are desirable.

5.3 Inducing restructuring

As demonstrated in §2.2, an instrumental *how* may trigger restructuring on a par with a subject-control verb in Amis. This renders the main verb analysis the strongest empirical support and merits a more in-depth enquiry.

5.4 The nominalization of a lexical verb

A resultant state follows from an activity temporally and usually functions as a secondary predicate in syntax cross-linguistically. It has been shown in the afore-mentioned sections that this is not the case in Tsou and Amis. In these languages, a resultative *how* consistently occurs as a main verb instead, with the lexical verb associated with it nominalized as an event noun in subject position. Tsou and Amis are typologically different from familiar languages such as English and Chinese.

5.5 The infinitive-taking of a causal *how*

A causal *how* targets a proposition and thus usually occupies the C position, taking a finite clause as its complement across many languages. I have shown that Tsou and Amis are different in this respect: A causal *how* appears under a tense/modal category and takes an infinitive as its complement in Tsou and Amis. This typological feature has escaped previous researchers' attention and deserves more in-depth studies.

5.6 The size of complements

In spite of being consistently a main verb in Tsou and Amis, different types of interrogative *how*s differ from one another in taking distinct constituents. It has been noted that a resultative *how* is predicated of a complex DP subject. I would also like to point out that a causal *how* does take a larger complement than its instrumental counterpart. Recall that the complement of a causal *how* might contain a negation in Tsou and a transitive verb in Amis, whereas no such an option is open for an instrumental *how*. The tripartite distinction made by Tsai (2008) for Chinese *how*-questions does seem to hold in Tsou and Amis, and differs in significantly distinct ways.

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Abbreviations

ABS	absolutive
CLF	classifier
COMP	complementizer
CONJ	conjunction
DET	determiner
ERG	ergative
GEN	genitive
HAB	habitual aspect
INTR	intransitive
IRR	irrealis
LOC	location
LNK	linker
NCM	noun-class marker
NEG	negator

NMLZ	nominalization
OBL	oblique
PL	plural
PN	personal name
POSS	possessor
PRF	perfect
PST	past
RECP	reciprocal
RELZ	relativizer
RES	resultative
RLS	realis
SG	singular
SUB	subordinate
TR	transitive

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External and internal negation and temporal asymmetries in Atayal

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This paper challenges the conventional understanding of the negators *iyat* and *ini'* in Atayal, demonstrating that they are not restricted to specific temporal references. It is proposed that *iyat* and *ini'* function as a propositional and event operator, respectively, without requiring additional assumptions about their semantics. The scopal difference between the two negators is supported by their ordering with tense and modal markers, as well as their doubling in sentences. The paper explores temporal asymmetries arising from the semantics of future-oriented modals, depending on whether they lexically encode an existential operator or an interval extending to the end of time. Overall, this analysis provides a unified explanation for the interaction between negation and other elements in Atayal, while raising empirical questions about temporal reference in sentences with nominal predicates.

Keywords: negation, external, internal, temporal, nominal, Atayal

1. Introduction

In propositional logic, negation serves as a unary connective and has a truth-function. The truth value of a proposition with negation depends solely on the truth value of the proposition. If we consider a proposition *P*, then *it is not the case that P* is represented as ¬*P*. Yet the simplicity of logical negation contrasts with the extremely complex and subtle properties of negative expressions (see Horn & Wansing 2022 for an overview). This paper offers evidence from Atayal, an Austronesian language spoken in the northern parts of Taiwan, with a focus on the dialect of Squliq Atayal. The goal is to show that the semantics of negation is indeed straightforward, involving a unary operator that varies only in scope, and that the observed complicated effects are the result of negation interacting with tense or other operators within its scope, and may also be affected by semantic or pragmatic constraints.

The phenomenon at issue is the choice between the two negators *iyat* and *ini'* in Atayal.[1] The consensus reached in previous descriptions views the choice primarily as a mood distinction

[1] Another negator that also occurs in declarative verbal sentences is *bali*, but because of its unique discourse function I shall not discuss it in this paper. Roughly speaking, the addressee must have assumed the proposition in question for the speaker to negate it with *bali*; see also Huang (2022: 259). The nature of this assumption needs further investigation.

(M. Su 2004; Huang 2008; Pitay 2014) or as a distinction in proximity to the event being described (Huang & Davis 1989), but a systematic examination of the use of the two negators challenges both ideas. There is evidence that the negators are generally possible in all temporal contexts, and their distribution bears a striking resemblance to the temporal pattern in affirmative sentences, with the exception of two temporal asymmetries due to semantic and pragmatic inadequacies.

The first asymmetry is in contexts of prediction, where *iyat* can be used but *ini'* cannot. This was previously seen as an inherent property of *ini'*, suggesting it is a special negator that cannot refer to the future. However, a closer examination of possible future contexts reveals that *ini'* is only incompatible with the modal specializing for prediction, not with other future-oriented modals. By comparing with felicitous *iyat* sentences in prediction and considering the scopal differences between the two negators, I argue that both ways of referring to the future proposed in the literature are encoded in Atayal future-oriented modals. The second temporal asymmetry concerns the (in)compatibility of *iyat* and *ini'* with temporal marking in present and past contexts: *iyat* requires temporal marking, while *ini'* forbids it. This asymmetry is also related to the unique usage of *iyat* to negate sentences with a nominal predicate. I argue that *ini'* competes with *iyat* and is chosen when the sentence contains a non-future pronominal tense, which is covert in Atayal (S. Chen 2018).

To support the distinction between external and internal negation, I provide a range of syntactic evidence, including the ordering of *iyat* and *ini'* with tense markers, circumstantial and epistemic modals, and the possibility of doubling two negators in the same sentence. The results show that *iyat* is asymmetrically higher than *ini'*, consistent with the hypothesis that *iyat* is a negator outside the sentence, while *ini'* is one inside the sentence. After cataloging nuanced facts and exploring the interactions between syntax, semantics, and pragmatics, I offer an explanation for (in)felicitous readings in a semantic composition.

The paper is organized as follows. §2 gives an introductory background on Atayal, consultants, and methods. In §3, my assumptions about the temporal and aspectual system of Atayal are stated. In §4, the differences between *iyat* and *ini'* are reviewed and discussed from the point of view of comparing the temporal reference of negative sentences with that in affirmative sentences. §5 provides new data on the temporal reference of negative sentences and the scopal difference between *iyat* and *ini'*. §6 contains my proposal and a semantic composition of negative sentences. §7 compares my analysis with two existing proposals. §8 is a conclusion with a typological and theoretical remark.

2. Data and methodology

The data in this paper are based primarily on elicited material in the Squliq dialect from my fieldwork. I also searched the online dictionary (Huang & Wu 2021) supported and maintained by the Council of Indigenous Peoples (CIP) in Taiwan, and two published oral narratives transcribed and translated into Mandarin by native speakers (Yuqih & Yupas 1991; Z. Su n.d.) for Atayal negators and Mandarin keywords.

I worked with two male and one female consultants from Wufeng Township in Hsinchu County, one male from Fuxing Township in Taoyuan County, and one male from Datong Township in Yilan County, all of whom are over 60 years old. Data from my previous elicitations with speakers in Hsinchu and Taoyuan also serve as a basis for comparison.

Examples elicited from my consultants will be presented without attribution, while other examples have been sourced. The orthography in most cited examples follows the source, except for the data from the texts where the orthography has been adjusted to the official version published by the CIP in 2005; the retained parts are the presence/absence of a glottal stop, word-final [n] or [l], and vowel qualities. Morpheme glosses in cited examples have been modified for consistency. In the examples I elicited, I often include context and/or speaker commentary to clarify the intended meaning. Some cited examples are provided with their original Mandarin translations for comparison.

3. Assumptions about tense and aspect in Atayal

This section provides an overview of temporal readings in affirmative sentences and forms the basis for examining the temporal readings of the negators *iyat* and *ini'*.

Temporal reference in Atayal can be either restricted to a non-future time interval or completely unrestricted, depending on the voice of the verb and the presence of an overt aspect marker. Aspectually unmarked sentences in the Actor Voice (AV) and those with an overt aspect marker allow for past or present interpretations but not future, unless an overt future marker is present. Conversely, aspectually unmarked sentences in the Non-Actor Voice (NAV) can be interpreted as past, present, or future.

Let us first consider sentences with overt aspect markers: the progressive aspect *cyux/nyux* ('distal'/'proximal') and the perfect aspect *wal*. (1) shows that progressive sentences in the present and past require no additional marker, but for the future, the auxiliary *musa'* is needed (2). For bare sentences without temporal or aspectual marking, the future affix *p-* for AV verbs

and the same form of NAV verbs (indicated below as *Ø*) can also be used. The two sets of future markers differ in the modality they allow—*musa'* denotes only prediction and volition, while *p-/Ø* are less restricted and compatible with all kinds of future contexts (see S. Chen 2018: 312–315).[2]

(1) a. Context: I am on the phone with my sister and I ask, "What are you doing?" She replies:
***nyux**=saku'* *maniq.*
PROG.PROX=1SG.ABS eat.AV
'I am eating.' (S. Chen 2018: 78)

b. *kt-an=su'* *hya'* *ssawni'* *ga,* *nanu'* ***cyux**=nya'* *bing-un?*
look-LV=2SG.ERG 3SG.NEUT earlier.today TOP what PROG.DIST=3SG.ERG hold-PV
'When you saw him earlier, what was he holding in his hand?' (S. Chen 2018: 290)

(2) Context: I know my grandfather has a habit of drinking after lunch, and he usually continues drinking until late in the evening. I think:
tehuk *ngasal* *ni* *yutas=mu* *suxan* *ga,* ****(musa')*** ***cyux***
arrive.AV house GEN grandfather=1SG.GEN tomorrow TOP FUT PROG.DIST
m-nbuw *qwaw* *na'.*
AV-drink wine still
'When I arrive at my grandfather's house tomorrow, he will still be drinking.' (S. Chen 2018: 291)

The meaning of the perfect aspect *wal* is complex, as it combines the properties of both a perfect aspect, including the result state and current relevance that hold at the reference time, and a perfective aspect. However, it also exhibits a temporal pattern similar to that of progressive sentences (see S. Chen 2018: 292–293 for examples).

Let us now focus on bare sentences. In (3a), (3c) and (4), we notice a similar distinction between non-future and future, with the future reading requiring the verb to be marked with *p-*. (3b), however, seems to be an exception: The inclusion of the present-time adverb makes the sentence infelicitous (without the present-time adverb, (3b) would allow only a habitual reading).

[2] Another way to express future readings in Squliq Atayal is through the reduplication of the initial consonant of the stem (*C-*) in NAV sentences and the future prefix *p-* (resulting in *pp-*) in AV sentences. However, unlike their reduplication counterparts in Mayrinax Atayal, the use of *pp-/C-* is limited to only the imminent future or for stronger beliefs (S. Chen 2018: 315–317). For this reason, I shall not discuss them further in this paper.

(3) a. *m-nbuw* ***shira'*** *hiya'.*
AV-drink yesterday 3SG.NEUT
'He drank yesterday.' / ≠ 'He was drinking yesterday.'
b. **m-nbuw* ***misuw*** ***qani****.*
AV-drink now this
Intended for 'He is drinking now.'
c. **m-nbuw* ***kira'*** *hiya'.*
AV-drink later.today 3SG.NEUT
Intended for 'He will drink today.' (S. Chen 2018: 283)

(4) ***p****-nbuw* ***kira'*** *hiya'.*
FUT.AV-drink later.today 3SG.NEUT
'He will drink today.' (S. Chen 2018: 283)

Rather than treating (3b) as an exception to the temporal dichotomy, S. Chen (2018) argues that the infelicity results from the lack of a progressive reading with bare eventive predicates. To achieve the intended reading in (3b), the progressive aspect must be present, as in (5); likewise, a progressive reading in the past would require the presence of the progressive aspect.

(5) ***cyux*** *m-nbuw* ***misuw*** ***qani****.*
PROG.DIST AV-drink now this
'He is drinking now (over there).' (S. Chen 2018: 283)

The fact that bare eventive predicates are incompatible with a present adverb in Atayal is a striking parallel to the incompatibility between the perfective aspect and the present tense in English (Bennett & Partee 2004): *He drinks* has a habitual reading but not an episodic one, unlike *He is drinking*. In Atayal, I assume that bare eventive predicates encode a perfective, but unlike the English perfective, it does not enforce culmination entailments (see S. Chen 2018: 75ff.). To support the analysis of (3b) as an aspectual constraint, (6) demonstrates that bare sentences with a stative predicate can be interpreted in the present or past because, unlike eventive sentences, they have no perfective(-like) aspect.

(6) a. ***m'uy**=saku'* *balay.*
tired.AV=1SG.ABS truly
'I am tired.'
Speaker's comment: You are tired right now.
b. Context: People tease me about my physical fitness. I reply, "Don't laugh at me..."
mrkyas=saku' *ga,* ***lawkah**=saku'* *m-qzinah* *ay.*
young.AV=1SG.ABS TOP good.AV=1SG.ABS AV-run PRT
'When I was young, I ran fast (lit. I was good in running).'

The above discussion focuses on AV sentences. With a verb in a NAV, future interpretations are allowed without additional marking, as in (7). I consider this an idiosyncratic property of NAV verbs and the non-future vs. future dichotomy the norm of most sentence types.

(7) ***thaygal-an*** *ni* *Tali'* ***{sraral/misuw*** ***qani/babaw=nya'}*** *laqi'* *qasa.*
bully-LV ERG Tali' before/now this / above=3SG.GEN child that
'Tali' used to bully that kid before.' / 'Tali' (often) bullies that kid now.' / 'Tali' will often bully that kid in the future.' (S. Chen 2018: 285)

Following Matthewson (2006), S. Chen (2018) argues that the distinction between non-future and future observed across different aspects motivates a covert pronominal tense referring to a non-future interval (hereafter abbreviated as NON-FUT).[3]

In addition to the covert tense, which allows interpretation in the past, present, or non-future, there is an infix *-in-* that forces the interpretation of sentences in the past. However, sentences marked with *-in-* allow for two kinds of past readings, depending on the length of the interval presupposed in the context (i.e., mutually understood by the interlocutors). A long interval leads to an experiential reading (8a), and a short interval to a past tense reading (8b). The reading in (8b) would be rendered in English by the simple past rather than the perfect *have*, suggesting that *-in-* is not the same as the perfect aspect.

(8) a. ***m-<n>agal*** *mit* *sraral* *hiya'.*
AV-<E.PST>take goat before 3SG.NEUT
'He has hunted goats before.'

[3] Following Partee (1973), the semantics of tense has been analyzed as a pronoun with a presupposition.

b. ***m-<in>qwalax*** *shira'*.
AV-<E.PST>rain yesterday
'It rained yesterday.'

A crucial empirical difference exists between sentences marked with *-in-* and the covert non-future tense when referring to a past time. The covert tense is preferred when the context presupposes a short past interval, notably in storytelling, where most sentences are unmarked and the default past tense is the covert tense. A similar contrast is seen below in negative sentences. The properties of *-in-* set it apart from the covert tense, leading S. Chen (2018) and S. Chen et al. (2021) to propose that *-in-* functions as an existential quantifier, asserting a past time at which the predicate holds. Hence, *-in-* is referred to as the existential past tense in this paper (abbreviated as EXIST PST in the text).

Some assumptions need to be made about the semantics and syntax of the above two sets of future markers. It is assumed that *musa'* encodes forward shift and modal semantics in its lexical meaning, while *p-/Ø* is just a forward shifter whose modality follows from the context. Tentatively, it is assumed that the future markers occupy the tense head T, since they are distributed complementarily to the past tense *-in-* and have quantificational properties. In simpler terms, the future markers have future modals in semantics but are in tense position in syntax; see §6.2 for an illustration.

4. Reviewing the differences between *iyat* and *ini'*

The negators *iyat* and *ini'* share several morphosyntactic properties: both are uninflected, occur preverbally, and attract bound pronouns (when in sentence-initial position).[4] However, an important difference lies in the fact that the verb following the negators is marked by a different set of voices, summarized in (9) (see (10–11) below for examples). Both negators are considered auxiliaries due to their ability to attract bound pronouns, which typically behave more like a head than an adverb in the language.[5]

[4] *Iyat* has two variants, *yat* and *izyat*, depending on the dialect or idiolect; I shall use *iyat* in the text for consistency and adopt the original transcription in examples cited.

[5] Huang (2022: 337–338) categorizes *iyat* as an adverb and *ini'* as an auxiliary, primarily due to the distinct voice forms that follow them. In this paper, it is argued that the two negators vary in scope, and I suggest that *ini'*, as a VP negator, imposes a unique morphological requirement on the verb.

(9) a. *iyat* requires voice affixes for indicative mood – Actor Voice *m-/-m-/Ø*, Patient Voice *-un*, Locative Voice *-an*, Circumstantial Voice *s-* – and a temporal affix if required.
b. *ini'* requires voices for dependent mood (i.e., the set of voices for imperatives and sentences with some negators and particles): Actor Voice *Ø*, Patient/Locative Voice *-i*, Circumstantial Voice *-an(i)*.

As for the meaning of the two negators, the translations in the earlier literature already indicate some differences, as given in Table 1. Rau (1992: 170–173) briefly lists several uses of *iyat*: to refer to actions that will not happen, cannot happen, or have not taken place, to negate nominal predicates, and to deny or refute the previous predicates, meaning 'No, it's not the case ...'. Later work has detailed these uses and compared them to *ini'*, revealing additional properties (Huang 1993; M. Su 2004; Huang & Wu 2018; Huang 2022).

Table 1. Translations of *iyat* and *ini'*

	iyat	*ini'*
Egerod (1965: 271)	will not...; do not want to...	did not...; have not...
Egerod (1966: 349)	do not want to...	did not...; have not...; cannot
Rau (1992: 169)	will not...; haven't...; cannot...; it's not the case...	did not...; does not...

In this section I review the documented differences and also point out where my observations differ. In §4.1–§4.3, I discuss future, past, and present interpretations of negative sentences respectively; §4.4 and §4.5 consider negative sentences with stative and nominal predicates, respectively; and §4.6 provides a summary.

4.1 (In)compatibility of *iyat* and *ini'* with future readings

A commonly described pattern for *iyat* and *ini'* is that *iyat* is felicitous in expressions about future events, whereas *ini'* is not. This is illustrated in (10) and (11), where *iyat* is consistent with a future interpretation, while *ini'* is consistent with either past or present. Notice that in (10), I use a habitual reading to demonstrate the infelicity of present readings because, similar to English, sentences without the progressive aspect in Atayal lack a present episodic reading (§3).[6]

[6] (10) also illustrates the morphological difference between an AV verb and a NAV verb following *iyat*: the prefix *p-* is used for the former, while there is no additional morphology for the latter (M. Su 2004: 353; Huang & Wu 2018: 138–139). This aligns with the same pattern found in affirmative declarative sentences, as seen in (4) vs. (7) above.

(10) a. ***iyat**=saku'* ***p-kznga'*** *m-wah.*
NEG=1SG.ABS FUT.AV-soon AV-come
'I won't come soon.' / ≠ 'I didn't come soon.' / ≠ 'I (usually) do not come soon.'
b. ***iyat**=nya'* ***niq-un*** *qu hi' bzyuwak hiya'.*
NEG=3SG.ERG eat-PV ABS body boar EMP
'He will not eat the pork.' / ≠ 'He didn't eat the pork.' / ≠ '??He (usually) does not eat the pork.'[7]

(11) a. *Bolung ga,* ***ini' tbaku'****.*
Bolung TOP NEG smoke.tabacco.AV.DEP
'Bolung does not smoke.'
Original translation: Bolung 不抽煙。(Huang & Wu 2021)
b. ***ini' s'an-i*** *ni Tali' qu ngta'.*
NEG feed-PV.DEP ERG Tali' ABS chicken
'Tali' didn't feed chickens.'

The incompatibility of *ini'* with future interpretations has sometimes been demonstrated by data such as (12–13). (12) shows that the presence of a future adverb is infelicitous with *ini'*, unlike a past adverb. (13) shows that the future auxiliary *musa'* is not compatible with *ini'*. The temporal restriction on *ini'* has led to the impression that it negates only non-future or realis events. For example, M. Su (2004: 66) uses realis and Huang (2008: 4) states that *ini'* is used "for past/realized events, including habitual ones", while *iyat* is used for "future/unrealized events";[8] see also Pitay (2014: 33).

(12) a. *ini'=ku qaniq* ***hira'****.*
NEG=1SG.ABS eat.AV.DEP yesterday
'I didn't eat yesterday.'
b. **ini'=ku qaniq* ***suxan****.*
NEG=1SG.ABS eat. AV.DEP tomorrow
Intended for 'I won't eat tomorrow.' (Huang & Davis 1989: 4)

[7] The habitual reading is generally lacking with a definite object, and is marked ??.
[8] But Huang (2022: 354–355) shows that *iyat* is also used to express past experience; cf. §4.2.

(13) ***musa' ini'** *pawng-i* *kkayal=su'.*
FUT NEG listen-PV.DEP word=2SG.GEN
'Your words will not be heard.'

However, non-future interpretation and reality are distinct concepts: the former relates temporal distinctions, while the latter encompasses various contexts beyond the future (see de Haan 2012). As will be shown in §5.1.1, *ini'* is felicitous with future events in multiple contexts, as previewed in (14). In §7.1, I shall explain how reality alone cannot adequately define the distribution of *ini'*. I shall argue that *ini'* is specifically incompatible with a particular type of future event, namely prediction.

(14) *m-<in>qwalax* *shira'.* *nway=ta'* ***ini'*** *p-qsya'-i* ***kira'*** *la.*
AV-<E.PST>rain yesterday DEON.POS=1PL.ERG NEG AUS-water-PV.NEG later.today COS
'It rained yesterday. We don't need to water the vegetables today.'
(lit. 'It is alright if we don't water the vegetables today.')

As for *iyat*, Rau (1992) suggests a modal-like reading (i.e., actions that cannot happen), as in (15) (also noted by M. Su (2004: 84)).

(15) *ya* *qani* *qu'* ***yat**=myan* *kzingyun.*
like this ABS NEG=1PL.EXCL.ERG forget.PV
'Things like this, we cannot forget.' (Rau 1992: 172)

However, this reading can be attributed to the modality of future marking. In (16), the prefix *p-* in an AV verb signifies intention or volition; the same modality is observed with NAV verbs in the future. This parallel modal reading suggests that *iyat* does not carry modality itself.

(16) Context: The dinner has been placed on the table. You say:
***p-qaniq**=saku'* *la.*
FUT.AV-eat=1SG.ABS COS
'I am going to eat.'
Volunteered translation: 我要吃了。

4.2 *iyat* and *ini'* and two types of past tense

Another difference between the two negators is that *iyat* is felicitous in expressions about past experiences marked by the existential past -*in*-, as in (17), while this reading has never been mentioned for *ini'*. The reason could be that *ini'* cannot precede -*in*-, which I shall justify in §5.2. A syntactic strategy to achieve the intended scope involves marking a numeral with *min*- in the predicate position, where *ini'* is embedded in the sentential subject, as in (18), but it needs further investigation whether *min*- is related to -*in*-.

(17) ***yat*** *m-<**in**>kucu'* *Tali'.*
NEG AV-<E.PST>put.on.shoes Tali'
'Tali' has never worn shoes.' (Huang & Davis 1989: 2)

(18) *min-cyugal* *nanak* ***ini'**=saku'* *p-qbubu'* *anquanmao.*[9]
MIN-three only NEG=1SG.ABS VBZR-hat.AV.DEP helmet
'There are only three times that I have not worn a helmet.'

In addition to the experiential readings, the sequence *iyat* ... -*in*- also allows for a non-experiential, past reading, as in (19), and the two types of readings parallel those found in affirmative sentences with -*in*- (as in (8) above).

(19) Context: You are back in Taiwan and it is very hot and not raining. You ask your mom whether it used to rain when you were not here. She replies:
iyat *m-<**in**>qwalax* *uzi.*
NEG AV-<E.PST>rain also
'It didn't rain either.' (S. Chen 2018: 195)

It is important to note that the past tense reading in (19), encoded by -*in*-, is not the same as the English past, for while the English past is pronominal, -*in*- asserts the existence of a past time (§3). This can be illustrated by (20), which reproduces Partee's (1973) famous example of turning off the stove, in which the reference time is understood as referring to a salient moment before the speaker departs, and requires a pronominal tense. In this context, the negative sentence with the covert NON-FUT tense and *ini'* is appropriate, but one with *iyat* and -*in*- (EXIST PST) is not.

[9] *Anquanmao* here and *biaoyan* in (36) are Mandarin words written in the Chinese Pinyin system.

(20) Context: You are driving on the highway after leaving your house. Then you realize that your stove is still on.
ini'=*maku'* *yuc-i* *qu* *gasu'* *la.*
NEG=1SG.ERG put.off-PV.DEP ABS gas PRT
'I didn't turn off the gas.' (S. Chen 2018: 235)

The interpretation of the negator and tense patterns in (19) and (20) can be paraphrased as in (21a–b). In the paraphrases (which preview the proposal I shall develop in §6), the modification of the negator differs due to the distinct scope, which will be demonstrated in §5.2: a time interval in (21a) versus an event in (21b). Specifically, *iyat* scopes over the existential operator encoded in the past tense -*in*-, while *ini'* can only negate the event since it follows the non-future tense.

(21) a. *iyat* ... -*in*- (EXIST PST) ... = **there is <u>no</u> past time** in which the described event holds
b. NON-FUT ... *ini'* ... = **at some past time** the described event does **<u>not</u>** hold

In summary, *iyat*, and perhaps also *ini'*, is compatible with past tense readings that arise from the experiential past tense, and *ini'* is compatible with the covert tense NON-FUT that refers to the past. An empirical question is whether *iyat* can be used with NON-FUT, i.e., if the sentence is unmarked and interpreted in the past (or present), can it be negated by *iyat*? I argue in §5.1.2 that the answer is affirmative, exemplified by sentences with a nominal predicate.

4.3 Present readings with overt aspect

The third difference in temporal readings of the negators is their interaction with aspect markers. *Ini'* immediately follows the aspect in the sentence (M. Su 2004: 81; Huang & Wu 2018: 142), as in (22). In contrast, *iyat* precedes an aspect marker and does not interact with it. The order reflects that *ini'*, but not *iyat*, is placed closer to the verb, as explained in more detail in §5.2.

(22) a. ***cyux*** ***ini'*** *ngilis* *qu'* *laqi'* *qani.*
PROG.DIST NEG cry.AV.DEP ABS child this
'This kid is not crying.' (Huang & Wu 2018: 142)
b. ***wal*** ***ini'*** *qwalax* *hira'.*
PFV.PRF NEG rain.AV.DEP yesterday
'It didn't rain yesterday.' (Huang 2008: 17)

An important question about the above data that has not yet been addressed is that of the temporal readings with which they are compatible (beyond translation). Recall that in affirmative sentences, aspectually marked sentences allow either a present or past interpretation (e.g., (1) and (6) above). We similarly expect aspectually marked sentences negated with *ini'* to allow a present (22a) or past (23) reading. (23) is an excerpt from a story in which the speaker recalled what would have happened had he met a bear in the mountains. It was clear from the context that the progressive aspect could only be interpreted as denoting the past.

(23) Text from a story: *nanu' yasa qu', a... mnkux balay lungan maku' a... mwa' nqu' stnaq ta' balay lmha, nyux ku' ini' bing lalaw uzi rwa, qani hiya' ga', Utux KayaX waN smiqa'*.
'Therefore I was very afraid. What would have happened if I had come across the bear? At that time I did not have a big knife with me. It was the Heavenly Father who drove away the bear.' (Rau 1992: 207)

nyux=*ku'*	***ini'***	*bing*	*lalaw*	*uzi*	*rwa.*
PROG.DIST=1SG.ABS	NEG	hold.AV.DEP	knife	also	PRT

(lit. 'I was also not holding a knife.')

An obvious asymmetry at this point is the lack of present interpretations for *iyat* sentences. Since present time reference in Atayal is exclusively given by NON-FUT, this raises the question of whether *iyat* can be used with NON-FUT. In §5.1.2, I demonstrate that sentences with nominal predicates can be negated with *iyat* and interpreted in the past or present. This suggests that NON-FUT indeed co-occurs with *iyat*, and that the absence of NON-FUT in verbal sentences needs an explanation. In §6.2, I propose that the two sequences *iyat*... *NON-FUT*... and *NON-FUT*...*ini'*... compete with each other in verbal sentences: Because the latter is unambiguous and more specific, it blocks the former.

The picture that emerges is that both negators are generally compatible with future, past, and present readings, as shown in Table 2. Note that the covert non-future tense (NON-FUT) can refer to either past or present (or even non-future) time, depending on the context, while the existential past tense *-in-* (EXIST PST) is restricted to the past. Thus, for different time references, there are two possible tenses for the past, but only NON-FUT for the present.

Table 2. Temporal reading of negative sentences in Atayal

		iyat	*ini'*
FUT	modals	√ (see (10); (15))	√ (except for prediction) (see (14); §5.1.1)
PST	EXIST PST	√ (see (17); (19))	? (*ini'* embedded in sentential subject) (see (18))
	NON-FUT	√(nominals only; see §5.1.2)	√ (see (11)b; (12)a; (20); (22)b; (23))
PRES	NON-FUT	√(nominals only; see §5.1.2)	√ (see (11)a; (22a))

The shaded cells in Table 2 indicate the areas where my observations differ from the previous literature (i.e., the availability of *ini'* with future readings) or are not explicitly discussed in the literature (i.e., the temporal reading of negative sentences with a nominal predicate). For further details, see §5.1.

4.4 Negation of stative verbs and temporal readings

The effect of negation on stative verbs is not mentioned in Rau (1992) but has been discussed by others, with opinions varying (Huang 1993; M. Su 2004; Huang & Wu 2018; Huang 2022). For example, Huang (2022: 347) states that *ini'* marks the non-existence of a state and M. Su (2004: 89–90) shows that both *iyat* and *ini'* co-occur with stative verbs, although the verb form and resulting meaning are different:[10]

(24) a. ***ini'*** *k-sbing* *qu* *qapu'* *qa.*
NEG STAT-sweet.AV.DEP ABS persimmon this
'This persimmon is not sweet.'
Original translation: 這柿子不甜。
Offered context: 在吃過柿子 [...] 之後發現不甜 [...] 所下的評論

b. ***iyat*** ***p****-k-sbing* *qu* *qapu'* *qa.*[11]
NEG FUT.AV-STAT-sweet ABS persimmon this
'This persimmon will not be sweet.'
Original translation: 這柿子（將來）不會甜。
Offered context: 知道柿子種植過程中 [...] 有瑕疵，或憑著柿子 [...] 外觀而下的臆測 (M. Su 2004: 90)

[10] M. Su argues that the prefix *k-* (or its variant *q-* or *Ø*) in stative verbs is an inchoative marker, but I shall take the view that it is part of the stative root, appearing only in certain environments such as negation (Huang 2022: 133–137), since there is no inchoative reading in (24a–b) and many other examples.

[11] In some dialects or with some verbs, the future prefix *p-* may be dropped; for example, *iyat ksbing* (or reduplicated *ssbing*) is attested for future interpretations in my elicitation. This gives the impression that *iyat* can be followed by a verb root.

Interestingly, the above contexts, with a present reading for *ini'* and a future one for *iyat*, are just two of the possible contexts in which stative verbs can be negated. (25–27) clearly show that *ini'* is compatible with an interval of varying temporal reference:

(25) *bqni' nanak hi'=su' sraral ha. wal=su' qthuy cikay ru*
bone only body=2SG.GEN before first PFV.PRF=2SG.ABS FAT a.bit CONJ
***ini'**=su' k-hikang la.* [Present]
NEG=2SG.ABS STAT-slim.AV.DEP COS
'You were just a bone before. You got a little fat and now you are no longer slim.' (Huang & Wu 2021)

(26) Context: A story about how the Atayal used to be headhunters, killing people who they did not think were good.
***ini'** balay blaq qu gaga' mrhuw=ta' raran.* [Past]
NEG really good.AV.DEP ABS culture sage=1PL.INCL.ERG before
'The culture of our ancestors was not really good.' (Z. Su n.d.: 70)

(27) *p-bebwax ha. teta'=su'* ***ini'*** *kilux.* [Future]
CAUS-be.naked first so.that=2SG.ABS NEG hot.AV.DEP
'Take off your clothes so you will not get hot.' (Huang & Wu 2021)

Similarly, there are past tense contexts for the use of *iyat*, in which the stative verb after *iyat* is marked by the past tense -*in*-, just as an eventive verb is marked in the past (e.g., (19) above):

(28) ***iyat*** *m-<**in**>r'tung qu bengan pazih qani pi? swa' nyux qruzyux lpi?*
NEG AV-<E.PST>short ABS handle hoe this Q why PROG.PROX long COS.Q
'Wasn't the handle of the hoe short? Why did it get longer?' (Huang & Wu 2021)

Given these additional readings, we can compare the negation of stative sentences with the negation of eventive sentences generalized in the previous subsections (see Table 2), which are parallel.

4.5 Negation of nominal predicates and pseudo-clefts

The final difference is the well-established observation that *iyat* is used to negate nominal predicates but *ini'* is not, as in (29). This has been regarded as an asymmetry in the negation of static and dynamic events (e.g., Huang & Davis 1989: 9; M. Su 2004: 69). However, such a view must explain why all past and future sentences with *iyat* are treated as static. Instead, I shall pursue a syntactic-semantic analysis that better fits the data.

(29) a. ***iyat*** *sinsiy qu hiya'.*
NEG teacher ABS 3SG.NEUT
'He is not a teacher.'
b. ****ini'*** *laqi' ni Payas qu Tali'.*
NEG child GEN Payas ABS Tali'
'Tali' is not the child of Payas.' (M. Su 2004: 69)

Additionally, in a pseudo-cleft sentence consisting of a nominal predicate and a headless relative clause as subject (despite the lack of relativizing morphology), *iyat* is allowed, but *ini'* is not, as in (30). This similarity in the use of negators has led to the grouping of pseudo-clefts with nominal predicates (e.g., Huang 2022: 351–355).

(30) {***iyat***/****ini'***} *Taymu' qu m-<in>buw qwaw na Tayal shira'.*
NEG Taymu' ABS AV-<E.PST>drink wine GEN Atayal yesterday
'Who drank Atayal wine yesterday was not Taymu'.' (M. Su 2004: 62)

However, pseudo-cleft equatives like (30) have a distinct semantic relationship between the two nouns in predicate and subject positions compared to those like (29a) (cf. Higgins 1973). Specifically, they are specificational, with the nominal predicate (i.e., *Taymu'*) being more referential than the subject (i.e., whoever drank Atayal wine yesterday) and specifying the content of the subject. In the literature on English copular sentences, the tense contribution in specificational sentences has been debated (see, among others, Sharvit 2003). For my investigation (§5.1.2), I shall focus on predicational sentences like (29a), which in principle allow for all temporal readings.

4.6 Summary and remaining differences

I have examined the differences between *iyat* and *ini'*, showing that both negators are compatible with different temporal references. In addition, I have highlighted some important syntactic differences, which are summarized in Table 3. Compared to *iyat*, *ini'* is closer to the verb, as reflected in the voice morphology of the verb, follows an overt aspect marker, and falls within the scope of future-oriented modals, except for those of prediction. In contrast, only *iyat* can negate sentences with a nominal predicate. These contrastive properties can be explained by the proposal that *ini'* scopes over the event, while *iyat* scopes over the proposition (see §5.2 for more evidence).

Table 3. Differences between *iyat* and *ini'*

Property	*iyat*	*ini'*
adjacency to the verb	no	yes
restriction on voice of the verb	no (indicative voice)	yes (dependent voice)
interaction with aspects	no	yes (aspect > *ini'*)
scope with future modals	above (*iyat* > FUT)	below (e.g., *nway* 'DEON.POS' > *ini'*)
scope with the existential past	above (*iyat* > EXIST PST)	n/a (morpho-syntactically restricted)
negation of nominal predicates	yes	no

There are other differences between *iyat* and *ini'* that I have not covered, such as the formation of the disjunction *ini' ga* 'or' – where *ini'* is used but *iyat* is not (e.g., M. Su 2004: 72) – and their use as a 'no'-particle in response to a *yes*/*no* question.[12] I suspect that both differences can be unified under the current proposal: in the first case, *ini'*, being a verbal negator, can negate an alternative choice of events, and in the second case, their use should parallel patterns of negation in complete sentences. However, further investigation of these awaits future work.

[12] Huang (2022: 351, 355) suggests that *iyat* and *ini'* in response to a *yes*/*no* question are equivalent to the Mandarin negators *bushi* and *meiyou*, respectively. Rau (1992: 173) indicates that that both negators can mean 'no', but *ini'* negates a verbal predicate, while *iyat* negates a nominal predicate. However, there are counterexamples for these ideas:

(i) A: *mita' su' teribiy krryax?* 'Do you watch the TV every day?'
B: ***ini'***, *mita'=saku' biru' krryax.*
NEG see.AV=1SG.ABS book every.day
'No, I read books every day.'
Original translation: 不，我天天讀書。(http://lokahsu.org.tw/resource/book/junior/06_junior_book.pdf)

(ii) A: *minhikang su' sraral lga?* 'Have you ever been slim?'
B: ***iyat*** *ay'!* / ***ini'*** *ay'!* 'No!'

5. New data

In this section, I present two new data sets on *iyat* and *ini'*, one on their temporal reference and the other on their syntactic hierarchy.

5.1 Temporal data

5.1.1 *Ini'* in intensional contexts

In §4.1, I noted that *ini'* is not entirely incompatible with future event readings. This may seem surprising, since the verb after *ini'* is morphologically constrained to be incompatible with a future affix and *ini'* is incompatible with the future auxiliary *musa'*. In this subsection, I show that when considering a broader range of future-oriented modal contexts, the true generalization is that *ini'* is incompatible with prediction.

While prediction is often associated with future morphemes, it is not the sole modality involving the future. As pointed out by Enç (1996: 349), "shifting an event to the future is a property common to a number of intensional expressions." Roughly speaking, intensionality refers to anything involving modality, functioning as a mapping from possible worlds to extensions (see e.g., von Fintel & Heim 2011). Enç gives some typical environments in English where the future can be referenced, such as imperative sentences, the embedded event of deontic modals, the complement of verbs expressing desires or demands, as seen in (31). In these examples, the time of the event (i.e., doing push-ups, winning the race, attending the meeting) must be after the utterance time.

(31) a. Do fifty push-ups.
b. You must do fifty push-ups.
c. I expect to win the race.
d. John requires us to attend the meeting.

We can examine whether *ini'* is felicitous in these environments. I shall omit imperatives because there are special negators for prohibitions (i.e., *laxi* and *ka*). Directive predicates often involve manipulative speech acts such as command, request, and exhortation. They are often paraphrased with imperatives and hortatives in a direct quotation of verbs of saying, and as expected, *ini'* is not used.

Desiderative predicates expressing desire, intention and plan are usually paraphrased with the modal *aki* in Atayal (see below). Other paraphrases involve 'restructuring clauses', which lack voice change (i.e., only the actor voice is possible), temporal marking, and are functionally impoverished (see e.g., T. Chen 2010; see also §5.2.3). While restructuring clauses with *ini'* are not found among the desire-like predicates in my data, there is a future-oriented restructuring clause with *ini'* in a story:

(32) *una yasa qu msbah* ***ini'*** *kngungu' qu q<in>yat-an qani.*
or that.way ABS renew.AV NEG timid.AV.DEP ABS raise<E.PST>-LV this
'Maybe this is the way my son (lit. whom I raised) can change not to be timid.'
Original translation: 也許這樣做才能使我的兒子有轉變的一天。(Yuqih & Yupas 1991: 107)

Let us move on to inherently future-oriented circumstantial modals: the circumstantial necessity modal *siki* 'must, have to', the deontic possibility modal *nway* 'may, can, be allowed to', and the circumstantial possibility modal *blaq* 'can' (see Pitay 2014; S. Chen 2018). (33–34), and (14) above, show that *ini'* is used after these modals to express the non-execution of an event in obligation or permission. Notably, the co-occurrence with these modals shows that the type or the strength of modality does not prevent the use of *ini'*.[13]

(33) Context: An Atayal story about the *requirements* a woman must meet to be tattooed.
siki ***ini'*** *p-'apal ki squliq ru* ***ini'*** *phmut*
CIRC.NEC NEG RECP-adulterate.AV.DEP DAT people CONJ NEG radom.AV.DEP
m-qyanux ga, mosa' blaq qu pintasan=nha' qasa ma.
AV-live TOP EPIST CIRC.POS ABS tattoo=3PL.GEN that EVID
'Only if they do not have sexual intercourse and do not live carelessly will their tattoos be good.' (Huang & Wu 2018: 286)

(34) *musa'* ***blaq*** ***ini'****=su' wah sasan la.*
EPIST CIRC.POS NEG=2SG.ABS come.AV.DEP morning COS
'You don't have to come the next morning (lit. It should be alright if you do not come…).'

[13] Epistemic modals are irrelevant here because they are syntactically much higher (§5.2.2) and require the presence of future modals if the embedded event is in the future.

In other intensional contexts like conditionals and generics, *ini'* is also used. I shall focus on its use with the modal *aki*, which marks counterfactual conditionals similar to English conditionals with *would*. (35–36) demonstrate that *ini'* can negate counterfactual events, where the event has occurred, but we imagine what would happen if they hadn't occurred in the past or if they occurred in the future instead. (37) illustrates a conditional (with the preceding utterance being its protasis) implying the opposite outcome in the actual world (i.e., you will not listen and you will fall down). Note that the sequence *aki...ini'* can be replaced by *kana* 'would not' (see also (39) below); in these cases the following verb must also be in the dependent voice, showing *kana* is the negative counterpart of *aki*.

(35) *maha ni* *ini'=su'* *usa'* *ga,* ***aki****=su'* ***ini'*** *tqilis.*
if NEG=2SG.ABS go.AV.DEP TOP CTF=2SG.ABS NEG scratch.AV.DEP
'If you had not gone, you would not have been hurt.'
Speaker's comment: You went, so you got hurt. (M. Su 2004: 147)

(36) Context: My mom arrived yesterday and watched our show.
maha ni *suxan* *tayhuk* *lga,* *aki=nya'* *ini'* *kta'* *qu*
if tomorrow arrive.AV COS.TOP CTF=3SG.ERG NEG see.LV.DEP ABS
m-<in>biaoyan=ta' *la.*
AV-<E.PST>show=1PL.INCL.GEN COS
'If she had arrived tomorrow, she would have missed our show.'

(37) *pung* *ke'=maku'* *ki.* {***aki****=su'* ***ini'*** / ***kana****=su'*}
listen.AV.IMP word=1SG.GEN PRT CTF=2SG.ABS NEG/ CTF.NEG=2SG.ABS
ktakuy.
fall.down.AV.DEP
'You should listen to my words. You would not fall down.'

The modal *aki* is also used beyond conditionals to express unattainable desires (i.e., 'want', 'wish', 'desire', etc.), and weak necessity modality (i.e., 'ought to'), in both of which uses the occurrence of *ini'* (or *kana*) is also possible.

(38) *baq* ***kana****=maku'* *bzir-i* *qay~qaya'* *qani*'.
know.AV CTF.NEG=1SG.ERG buy-PV.DEP PL-stuff this
'I wish I had not bought this stuff.'

(39) {***aki***=*su'* ***ini'*** / ***kana***=*su'*} *ps'ari* *isu'* *hiya'* *la.*
CTF=2SG.ABS NEG/ CTF.NEG=2SG.ABS greedy.AV.DEP 2SG.NEUT EMP COS
'You should not be greedy.' (You are already rich.)

Two other markers, *teta'* (or the variant *tayta'*) and *hala*, which can be translated as 'so that/otherwise/lest/for fear that/in case of...', behave like *aki*, but are used specifically in purpose clauses or contexts of apprehensive/timitive modality (where the event has not yet occurred, but one hopes that it will not). They can also co-occur with *ini'*, as in (40) here and (27) above.

(40) *p-k-cingay* *m-aras* *k~krong* *qasa* *ki.* ***hala*** ***ini'*** *k-tnaq* *la.*
CAUS-STAT-many AV-bring PL~hook that PRT lest NEG STAT-enough COS
'Bring as many of these hooks as you can. Otherwise it will not be enough.'
Original translation: 多帶一點鉤子，免得不夠。(Huang & Wu 2021)

Another case is a warning like (41), where *ini'* seems to yield a rhetorical reading and the complement containing it is full rather than reduced (indicated by the bound pronoun on *ini'* rather than on *kte*) and comparable to an *if/whether*-clause in English:

(41) *kte* *ini'=misu'* *an* *s-plawa'* *kinsat* *ki!*
see.DEP.LV NEG=1SG.ERG.2SG.ABS CV.DEP CV-beckon police PRT
'Wait and see if I will call the police for you!' (Huang & Wu 2021)

Lastly, *ini'* can be found in sentences expressing generalizations or habitual events, marked by *mutux* (and its variants *mutu(w)*) in Atayal. For instance, in (42), the context makes it clear that the habit of eating pork will not persist in the future.

(42) Context: He used to eat pork, but decides to give up this habit.
babaw=nya' *lga* *mutux* *ini'* *qaniq* *bzyuwak.*
above=3SG.GEN COS.TOP HAB NEG eat.AV.DEP pork
'He will not eat pork in the future.'

Overall, the examination of different intensional contexts reveals that *ini'* is *not* incompatible with future events. Its limitation lies in its interaction with one specific modality: prediction. In §6.2, I propose that this gap in prediction is due to the presence of an existential operator over time in the lexical semantics of the future modals.

5.1.2 A preliminary picture of temporal reference in sentences with nominal predicates

Recall that only *iyat* can negate sentences with a nominal predicate (§4.5). Focusing on the temporal reference of predicational sentences, as in (43), a question arises whether there is a covert tense NON-FUT. Investigating this issue is challenging because clear references to past or future times often prompt the consultant to use overt temporal affixes, which require verbal sentences. For instance, in (44a–b), the nominal *sinsiy* 'teacher' needs to be verbalized before the past and future markers can be attached. Additionally, (44c) shows that the future auxiliary *musa'* (here the variant *mosa'*) cannot directly precede the nominal predicate.[14]

(43) *iyat=su'* *tayal* *na* *Bnka?*
NEG=2SG.ABS human.being GEN Taipei
'Are you not a Taipeier (lit. people of Taipei)?'

(44) a. *iyat=saku'* ***m-<in>-'-sinsiy*** *ay.*
NEG=1SG.ABS AV-<E.PST>-VBZR-teacher PRT
'I have not been a teacher.'
b. *babaw=nya'* *ga,* *iyat=saku'* *p-'-sinsiy.*
above=3SG.GEN TOP NEG=1SG.ABS FUT.AV-VBZR-teacher
'I will not be a teacher.'
c. **babaw=nya'* *ga,* ***mosa'****=saku'* ***sinsiy****.*
above=3SG.GEN TOP FUT=1SG.ABS teacher
'Intended for 'I will be a teacher.'

There are still affirmative and negative sentences with a nominal predicate that allow for a different temporal reference. In (45–46), the context specifies the temporal reference in the past, unlike the example in (43), which is presumably asked at the time of utterance and interpreted in the present.

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[14] *Musa'* can appear in (44b), as shown in (i). Such uses of *musa'* are analyzed as an epistemic modal (§5.2.1).

(i) *babaw=nya'* *ga,* ***mosa'****=saku'* ***iyat*** ***p-'-sinsiy****.*
above=3SG.GEN TOP EPIST=1SG.ABS NEG FUT.AV-VBVR-teacher
'I (probably) will not be a teacher.'

(45) Context: You are surprised at how beautiful this mountain looks. You remember that it did not look like this before.
sraral ga, rgyax qani hiya' ga, wiway btunux ru bqzi' kwara'.
before TOP mountain this EMP TOP mere stone CONJ thorn all
'This mountain was full of stones and thorns before.'

(46) Context: You are surprised at how this mountain looks now. You remember that it used to be green grass and not full of stones and thorns as it is now.
rgyax qani ga, (sraral,) ***iyat*** *btunux ru bqzi'.*
Mountain this TOP before NEG stone CONJ thorn
'This mountain was not full of stones and thorns.'

Since nouns in the predicate can be temporally conditioned like verbs (i.e., the property belongs or once belonged to the subject), it supports the idea of having NON-FUT under *iyat*. However, an initial examination of sentences with a nominal predicate in the future time reveals that the order of *musa'* before *iyat* is accepted, while the reverse order is rejected:

(47) Context: There is a plan to green the mountain in your hometown. You are looking forward to seeing a different view.
rgyax qani ga, ***mosa' iyat (*mosa')*** *btunux ru bqzi' babaw=nya' la.*
mountain this TOP MOSA' NEG FUT stone CONJ thorn above=3SG.GEN COS
'This mountain will not be full of stones and thorns in the future.'

Data such as (47) do not immediately falsify the postulation of NON-FUT in such sentences. For one thing, future markers and an inherent noun are incompatible a priori (see (44c)), and for another, the higher *musa'* is likely an epistemic modal (see Footnote 14, (57–58) and the discussion there). However, the data offer other possibilities for analyzing the temporal reference of sentences with a nominal predicate, such as a fully unrestricted temporal pronoun or a tense-free analysis. Further empirical work is needed to test these hypotheses.

Regarding whether other lexical categories, especially verbs, can function as nominals in the predicate position and be negated by *iyat*, the evidence seems to support this for stative verbs. Su (2004: 85, 90) points out clear morphological evidence in examples like (48), where the voice morphology of the verb is the same as in the indicative without a past or future affix, but differs from the morphology occurring after *ini'* (cf. *ini'knguray* 'not deaf and dumb' and *ini'kqtux* 'not salty', respectively). The absence of past or future affix in these examples is significant, as the use of *iyat* in canonical verbal sentences depends on these temporal affixes.

(48) a. ***iyat*** ***mnguray*** *qu* *Tali'*.
NEG deaf.and.dumb.AV ABS Tali'
'Tali' is not a deaf-and-dumb person'.
Original translation: Tali' 不是聾啞人。(M. Su 2004: 85)
b. ***iyat*** ***qmtux*** *wal=maku'* *tlam-an* *la*.
NEG salty.AV PRF=1SG.ERG try-LV COS
'What I tasted (lit. the food I tasted) was not salty food.'

Moreover, these sentences have an interpretation that is almost equivalent to negating the corresponding stative verb with *ini'* (Huang 1993: 74). This similarity may be due to the predicational nature of these sentences, where the property of belonging to the deaf-dumb and salty food is ascribed to *Tali'* and the food I tasted, respectively.

The empirical situation with eventive verbs is unclear. Verbal nominals are realized in the form as headless relative clauses, resembling a full verbal clause. In (49), the structure would be an equational sentence if the verb in the predicate is part of a relative clause. Additionally, both *iyat* and *ini'* are possible in verbal sentences, making it challenging to determine if a surface verb in the predicate can be a pseudo-cleft. This issue requires further investigation.

(49) Context: Back in your hometown, searching for your old house, you find yourself standing in front of a house, and you say to yourself:
ngasal *qani* *ga,* *iyat=maku'* ***k<in>i'-an***.
house this TOP NEG=1SG.ERG live<E.PST>-LV
'This house is not the one I lived in.'

5.2 Syntactic data

The following subsections discuss the difference between *iyat* and *ini'* in height, drawing evidence from their interaction with tense and modals and their co-occurrence in the same sentence.

5.2.1 Interaction with future and circumstantial modals

The combinations of *iyat* and *ini'* with the two future markers – the modal *musa'* and the affix *p-/Ø* – are limited. Consider *musa'* first. As in (50a–b), both negators cannot precede *musa'*. The impossible sequence in (50c) will be argued to result from a semantic reason (§6.2), and the one in (50d) is due to *musa'* being an epistemic modal (see below).

(50) a. **ini'... musa'* (cf. *ini'... usa'* 'not go')
b. **iyat ... musa'* (OK only if *musa'* is a verb, see Huang (2008))
c. ***musa'... ini'*** (see (13) above)
d. ***%musa'... iyat*** (OK only if *musa'* is an epistemic modal; see (57) below)

Let us examine the order of *iyat* and *ini'* with *p-/Ø*. In (51a–b), *p-/Ø* cannot come before either negator since it must be attached to a verb head. The sequences in (51c–d) imply an asymmetrical relation with the tense head between *iyat* and *ini'*, based on the analysis presented in §3 where future modals are in the tense head. Pitay (2014: 33–35) proposes a similar hierarchy, as in (52), where *iyat* is higher than TP and *ini'* is lower than TP but higher than VP. She argues that *ini'* prevents the verb from rising to the tense head, explaining why it receives a different set of voice morphology. However, we lack direct evidence for TP being higher than *ini'*, as the combinations of *ini'* with the future marker are not allowed, as in (50a, c). Below, I provide evidence for the order of TP and *ini'* from interactions with circumstantial modals.[15]

(51) a. **p-/Ø ... ini'*
b. **p-/Ø ... iyat*
c. **ini' ... p-/Ø*
d. *iyat ... p-/Ø* (see (10) above)

(52) *iyat* > TP > AspP > *ini'* > VP

Recall that *ini'* can occur with other future-oriented modals, such as circumstantial modals, and in such cases, *ini'* must follow the modal, as shown in (14), (33), and (34) above. This suggests the hierarchy in (53). (The order between AspP and *ini'* is discussed in §4.3; for the data that AspP is lower than circumstantial modals, see S. Chen (2018: 462).)

(53) $\text{ModP}_{\text{CIRC}}$ > AspP > *ini'* > VP

Moreover, circumstantial modals allow both a present evaluation time (e.g., (14) and (34) above), and a past evaluation time, as in (54). In the context of (54), present evaluation time is not available because the speaker is no longer allowed to take the road.

[15] A question immediately arises why *p-/Ø* can follow *iyat* (51d), while *musa'*$_{\text{FUT}}$ cannot (50b). There are two possible reasons: (i) *p-/Ø* and *musa'*$_{\text{FUT}}$ compete with each other, or (ii) they are lexically distinct – *musa'*$_{\text{FUT}}$ being a modal and *p-/Ø* a non-modal (i.e., forward-shifting operator). Since in affirmative sentences the two future markers are interchangeable in prediction and do not compete with each other, I prefer the latter view, which is also consistent with the fact that none of the modals in Atayal can follow *iyat* (§5.2.1).

(54) Context: You are driving to the road that you usually take but a policeman prevents you from taking the same road today.

aw' ***blaq*** *wah-an sa wayal hrwa', swa' ini' baq-i*
PRT CIRC.POS go-LV LOC past PRT why NEG ABIL-PV.DEP
musa'=misu qa la?
go.AV=1SG.ERG.2SG.ABS here PRT
'But I could go this way before! Why can't you let me go now?' (S. Chen 2018: 441)

Assuming that circumstantial modals are lower than TP hosted by NON-FUT, as in (55), explains the availability of present and past evaluation times. This assumption not only captures compositional meanings in Atayal but is also consistent with a cross-linguistic pattern where the temporal interpretation of modals is determined by their interaction with tense and aspect operators (Condoravdi 2002; S. Chen et al. 2017). By transitivity, (53) and (55) lead to (56), where *ini'* is lower than TP.

(55) TP > $ModP_{CIRC}$

(56) TP > $ModP_{CIRC}$ >AspP > *ini'* > VP

Returning to the sequence *musa' ... iyat* in (50d), as shown in (57), earlier studies have regarded it as akin to *iyat ... p-/Ø* in (51d), also forming a negative future sentence (Rau 1992: 171; Huang 2008: 8; Huang 2022: 160). The sequence *musa'... iyat* raises the question of whether *iyat* takes scope under the future.

(57) ***musa'*** ***yat*** *p-qbaq lmpuw squ' biru' na Tayan.*
MUSA' NEG FUT.AV-know read.AV OBL book GEN Atayal
'They will not know how to read The Atayal Alphabet.' (Rau 1992: 172)

I argue against the assumption that *musa'* before *iyat* is the same future modal *musa'*, which is why I mark the sequence *musa'...iyat* in (50d) as %. Instead, I propose that the higher *musa'* is an epistemic modal, for the following reasons. First, the verb after the sequence *musa' iyat* already carries a future morphology (i.e., *p-/Ø*). Second, there is evidence that the auxiliary *musa'* is clearly ambiguous between a future prediction and a present epistemic interpretation (the so-called presumptive use), the latter evidenced by (58). Third, as will be discussed in §5.2.2, the fact that *iyat* follows an epistemic modal holds independently.

(58) Context: I try to soothe my friend whose child hasn't yet come home from school at the usual time: "Don't worry…"

musa' *hazi'* *cyux* *tuqi* *qu* *laqi'=su'* *na'.*
EPIST EPIST.POS exist.DIST road ABS child=2SG.GEN still
'Your kid will still be on the way (lit. on the street).' (S. Chen 2018: 318)

The sequence *musa' iyat...p-/Ø* being not equivalent to *iyat...p-/Ø* confirms that *iyat* is higher than TP. However, despite the established order *iyat* > TP > $\text{ModP}_{\text{CIRC}}$, *iyat* cannot scope over circumstantial modals or any modal. The intended reading 'not possible' or 'not necessary' is achieved when a different modal scopes over negation (i.e., 'must not' or 'may not'). This aligns with my analysis in §6, where I propose that *iyat* takes an argument of type *<s,t>* rather than *<i,st>* like modals.

5.2.2 Interaction with epistemic modals

In many languages, including Atayal, epistemic modals can appear in a higher position than TP. In Atayal, there are two epistemic modals, the auxiliary *ki'a* and the adverb *hazi'* (Pitay 2014; S. Chen 2018). These epistemic modals are typically interpreted with a present evaluation time (S. Chen 2018: 435–439) and allow for any temporal orientation as seen in modal-less sentences. This suggests an analysis where the epistemic modals scope over both tense and aspect, (59), with its evaluation time determined by an indexical pronoun denoting the utterance time.

(59) $\text{ModP}_{\text{EPIST}}$ > TP > AspP > VP

Now we can consider the ordering of *iyat* and *ini'* and the epistemic modals. Pitay (2014) shows that the modal *ki'a* must precede *ini'*, (60), as expected if *ki'a* is higher and *ini'* lower than TP.

(60) a. ***ki'a*** [$_{\text{TP}}$ ***ini'*** *qbusuk* *Yumin*].
EPIST.POS NEG drunk.AV.DEP Yumin
'Yumin might not have been drunk.'
b. ****ini' ki'a*** *qbusuk Yumin*. (Pitay 2014: 36)

We also find that *ki'a* precedes *iyat* in cases where the speaker speculates on the non-existence of a past event (61).

(61) *ana luqus na bqni' cyux=nya' sib-an.* ***ki'a*** ***iyat***
even marrow GEN bone PROG.DIST=3SG.ERG suck-LV EPIST.POS NEG
m-<in>aniq ana nanu'.
AV-<E.PST>eat even what
'Even marrow of bone has he sucked. He might not have eaten anything.' (Huang & Wu 2021)

Interestingly, the co-occurrence of *ki'a* and *iyat* is considered infelicitous when the event is in the future, as in (62a) (Pitay 2014: 37). A same constraint is also observed without *iyat*, as in (62b–c) (with variable judgments on b). This might be due to pragmatic competition between *ki'a* and *hazi'*, since the expressions in (62) would all be fine if *ki'a* were replaced by *hazi'*; this needs further investigation.

(62) a. ****ki'a*** ***iyat*** ***p****-busuk Yumin.*
EPIST.POS NEG FUT.AV-get.drunk Yumin
'Yumin might not get drunk.' (Pitay 2014: 37)
b. ?***ki'a*** ***p****-qwalax.*
EPIST.POS FUT.AV-rain
Intended for 'It might rain.'
c. ??***ki'a*** ***musa'*** *betunux babaw=nya' laqi' qani.*
EPIST.POS FUT smart.AV above=3SG.GEN child this
Intended for 'This kid might be smart in the future.' (S. Chen 2018: 444)

The sequences where the epistemic modal precedes *ini'* and *iyat* provide evidence for the hierarchy in (63), despite the limitation on future orientation. This hierarchy also holds for the epistemic modal *hazi'*, as in (64), although *hazi'* as an adverb can appear in many places in the sentence.

(63) $\text{ModP}_{\text{EPIST}}$ > *iyat* > TP > AspP > *ini'* > VP

(64) *hazi' iyat (hazi') m-wah (hazi') Yumin.*
EPIST.POS NEG EPIST.POS AV-come EPIST.POS Yumin
'Yumin might not come.' (Pitay 2014: 36)

The question of whether *iyat* can scope over the epistemic modals remains, and the evidence suggests it cannot. Firstly, *iyat* does not precede *ki'a* or *musa'*$_{\text{EPIST}}$, nor any other modal (§5.2.1).

Secondly, scope in Atayal is usually surface-oriented, without covert wide scope of negation. The intended reading of epistemic possibility under negation (i.e., 'not possible') can be paraphrased by the adverbial verb *nbah* 'rarely, hardly, seldom' under negation, as in (65) (cf. Pitay 2014: 37).

(65) a. ***iyat*** ***nbah*** *m-sbzih* *qu* *inlungan=maku'*.[16]
NEG rarely.AV AV-return ABS heart=1SG.GEN
'My heart will not return (lit. will hardly return).'
Original translation: 我心意已決，不可能再回頭。(Huang & Wu 2021)

b. ***iyat****=maku'* ***bah-un*** *z<m>ungi'* *krryax!*
NEG=1SG.ERG rarely-PV forget<AV> every.day
'I will never forget (lit. will hardly forget)!'

Based on the above data on interactions with two types of modals, we arrive at the following syntactic hierarchy:

(66) $\text{ModP}_{\text{EPIST}}$ > *iyat* > TP > $\text{ModP}_{\text{CIRC}}$ > AspP > *ini'* > VP

5.2.3 Double negation

I have shown that *iyat* and *ini'* have different syntactic heights, with *iyat* being higher and *ini'* being lower than TP. Interestingly, a search of an online dictionary (Huang & Wu 2021) reveals examples of *ini'* (67) or *iyat* (68) preceding *ini'*, but no examples of *iyat* following another negator (i.e., *ini'...iyat*... or *iyat...iyat*...), further supporting their distinct syntactic position.

[16] The word *nbah* here (and in (68) below) appears to deviate from the generalization that negative AV sentences with *iyat* require a future marker for future interpretation. However, this exception may only be apparent due to two reasons: Firstly, there are instances in my fieldnotes where the future marker attaches to the lexical verb, as in (i), suggesting a possible change in the syntactic status of *nbah* (becoming an adverb). Secondly, the future form of *nbah* is unclear, with some speakers accepting *pnbah* while others reject it.

(i) ***iyat*** *nbah* ***p-qwalax***.
NEG rarely.AV FUT.AV-rain
'It will not rain suddenly.'

(67) ***ini'*** *nbah* ***ini'*** *p-t'alax* *qu* *ini'* *p-ssi* *inlungan* *hiya'*
NEG rarely.AV.DEP NEG CAUS-part.AV.DEP ABS NEG RECP-put.AV.DEP heart EMP
la.
COS
'The couples who do not give their hearts to each other are hardly not separated.'
Original translation:（夫妻）彼此不信任的人，終究會使雙方分離。(Huang & Wu 2021)

(68) *m-<in>klama'* *sraral* *na'* *qu* *tuqi* *qani.*
AV-<E.PST>beforehand before still ABS road this
iyat *nbah* *ini'* *sluhi.*
NEG rarely.AV NEG collapse.AV.DEP
'This road has been cracked before. It is unlikely not to collapse.'
Original translation: 這條路很久以前就有裂痕，一定會崩塌。(Huang & Wu 2021)

The attested sequences in (67–68) confirm that *ini'* is syntactically lower than *iyat*. These examples involve negated elements like *nbah* and *pt'alax* or *sluhi*, which are realized as verbs, indicated by their voice inflection. The resulting meanings indicate event modification, such as 'They are hardly not separated' and 'It is hardly not going to collapse'. This implies a mono-clausal structure where the second verb is restructured to subordinate the first verb.

The example in (69) shows that the restructuring verb can indeed be negated by *ini*'. The matrix verb, which is semantically an adverb, is in NAV. Additionally, the absolute-marked subject of the sentence serves as the thematic argument of the second verb 'put, place', providing evidence that the argument receives Case from the matrix verb due to restructuring (see e.g., Tingchun Chen 2010).[17]

(69) *pyang-un=maku'* ***ini'*** *si* *rento* *qu* *tuqi=maku'.*
deliberate-PV=1SG.ERG NEG put.AV.DEP light ABS road=1SG.GEN
'I deliberately didn't put light on my road.' (Huang & Wu 2021)

[17] An alternative analysis in which (67–68) have a full clause as subject is not possible. On this view, all four combinations would have been possible, allowing both *ini'* and *iyat* to negate the second verb. Moreover, in such a structure, the bound pronoun would have had to be attached to the verb in the sentential subject, not to the matrix verb as in a restructuring structure.

6. The proposal

6.1 *Iyat* and *ini'* as external and internal negation

The syntactic properties discussed so far are summarized here:

(70) a. The syntactic order in terms of interaction with tense and modal markers shows:
  (i) *iyat* is higher than TP;
  (ii) Circumstantial modals are lower than TP but higher than *ini'*;
  (iii) Epistemic modals are higher than both negators.
  b. Double negation shows that only *ini'* can follow another negator in the same sentence.

I propose that *iyat* and *ini'* are a propositional and predicate operator – also known as external and internal negation – respectively. Additional support comes from sentences with an in-situ constituent focus as in (71) (the focus is underlined), where only *iyat* can negate the focus constituent.

(71) *musa' m-qumah m-k-rusa', **iyat** musa' <u>kira'</u>.*
go.AV AV-cultivate AV-STAT-two NEG go.AV later.today
'I am going to farm after two days, not (going) today.

Authors sometimes use the terms 'external' and 'internal' to distinguish whether negation negates a presupposition (i.e., metalinguistic negation). Horn (2001) argues that negation is a sentence-internal operator in all languages, a consequence of his proposal that external negation is purely pragmatic. However, Kroeger (2014) provides evidence against this view with the Malay negators *bukan* and *tidak*, whose choice is made along a syntactic distinction similar to the one I argue for here. None of the examples in my study involve the cancelation of a presupposition, making it less likely that *iyat* and *ini'* are specialized for metalinguistic negation. However, further research is needed in this area.

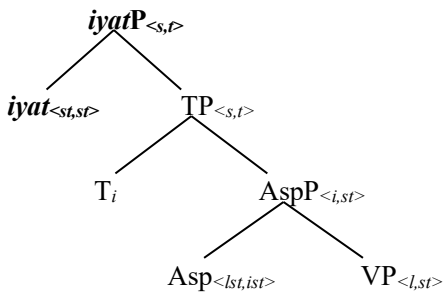
6.2 Syntactic and semantic composition and pragmatic competition

I propose that *iyat* negates the entire proposition by taking a TP of type $<s,t>$ as its argument (72a), while *ini'* negates the event denoted by the predicate by taking an eventuality of type $<l,st>$ (72b).

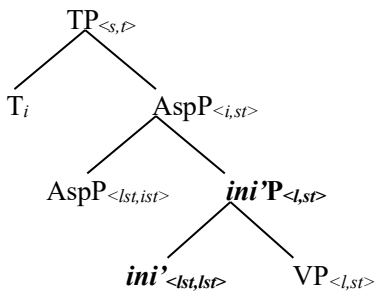
(72) a. $[\![iyat]\!]^{g,c} = \lambda P_{<s,t>}\ \lambda w.\ \neg[P(w)]$
b. $[\![ini']\!]^{g,c} = \lambda P_{<l,st>}\ \lambda e\ \lambda w.\ \neg[P(e)(w)]$

Both negators are functional heads and project a phrase over TP and VP, respectively, as shown in (73a–b). The T head can be hosted by either (i) a non-future tense (NON-FUT) of type *i* or (ii) a future operator in combination with modality or an existential past (EXIST PST), both of which are of type <*ist,ist*> (see §3). Here, NON-FUT is given in the structures of (73).

(73) a.



b.



In this analysis, (74) (repeated from (22a)) is assigned the structure in (73b). The progressive aspect and perfective aspect are assumed to have simple denotations for ease of illustration, as shown in (75a–b). Additionally, (74) contains the non-future tense NON-FUT, whose presupposition is limited to a non-future interval, as in (75c).

(74) *cyux* *ini'* *ngilis* *qu'* *laqi'* *qani.*
PROG.DIST NEG cry.AV.DEP ABS child this
'This kid is not crying.'

(75) a. $[\![PROG]\!]^{g,c} = \lambda P\ \lambda t\ \lambda w.\ \exists e\ [P(t)(w)\ \&\ t \subseteq \tau(e)]$
b. $[\![PFV]\!]^{g,c} = \lambda P\ \lambda t\ \lambda w.\ \exists e\ [P(t)(w)\ \&\ \tau(e) \subseteq t]$
c. $[\![\text{NON-FUT}_i]\!]^{g,c} = g(i)$, defined only if no part of g(i) is after t_c (adopted from Matthewson 2006: 680)

The semantic composition of (74) proceeds bottom to top, as shown in (76). The resulting truth conditions in (76d) correctly state that there is no crying event whose runtime overlaps with the non-future reference time.

(76) a. $[\![VP]\!]^{g,c} = \lambda e\ \lambda w.\ cry(e, this.child)(w)$
b. $[\![ini'P]\!]^{g,c} = \lambda e\ \lambda w.\ \neg[cry(e, this.child)(w)]$
c. $[\![AspP]\!]^{g,c} = \lambda t\ \lambda w.\ \neg[\exists e[cry(e, this.child)(w)\ \&\ t \subseteq \tau(e)]]$[18]
d. $[\![TP]\!]^{g,c} = \lambda w.\ \neg\exists e[cry(e, this.child)(w)\ \&\ g(i) \subseteq \tau(e)]$, defined only if no part of g(i) is after t_c

Let us discuss the infelicitous use of *ini'* in prediction (77a) and the well-formedness of *iyat* (77b), taken from (10a) and (13), respectively. I assume *musa'* and *p-/Ø* have the lexical entry in (78a) and (78b), respectively: *musa'* carries modal semantics and universally quantifies over a set of metaphysical worlds w' accessible from the actual world w and the evaluation time t, further ranked best by some facts in the actual world (represented by Modal Base/MB(w,t) according to Kratzer's analysis, see Kratzer 2012, among others). On the other hand, *p-/Ø* is a forward shifter with modality derived from context, reflecting the fact that it is generally unrestricted in the future and following *iyat* (see Footnote 14 and §3), similar to the existential past tense. Both *p-/Ø* and *musa'* encode an existential quantifier over time following the evaluation time t at which P holds.

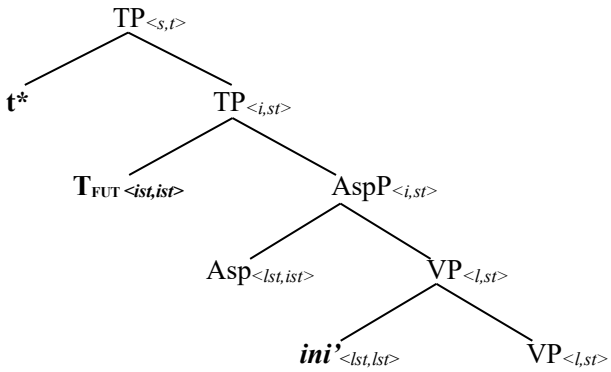
(77) a. ***musa' ini'** *pawng-i* *kkayal=su'.*
FUT NEG listen-PV.DEP word=2SG.GEN
'Your words will not be heard.'
b. ***iyat**=saku'* ***p**-kznga'* *m-wah.*
NEG=1SG.ABS FUT.AV-soon AV-come
'I won't come soon.'

(78) a. $[\![musa'_{FUT}]\!]^{g,c} = \lambda P_{<i,st>}\ \lambda t\ \lambda w.\ \forall w'\ [w' \in MB_{Meta}(w, t)) \longrightarrow \exists t'\ [t < t'\ \&\ P(t')(w')]]$
b. $[\![p\text{-}/\emptyset]\!]^{g,c} = \lambda P_{<i,st>}\ \lambda t\ \lambda w.\ \exists t'\ [t < t'\ \&\ P(t')(w)]$

Both future markers are of type <*ist,ist*>. After taking the AspP with the perfective in (75b), the evaluation time t is saturated with an indexical pronoun t* denoting the utterance time. The structure for (77a) is illustrated as (79), leading to the final output of the semantic composition shown in (80).

[18] A compositional problem arises as the VP negation appears to be interpreted after the aspect is combined. Aspect operators map properties of events into properties of times by closing the event variable. However, since VP negation denotes that the relation between e and w does not hold, with the existential closure of the event, it ends with the non-existence of e in w. This leads to the prediction that internal negation modifying VP or AspP yields a similar outcome.

(79)

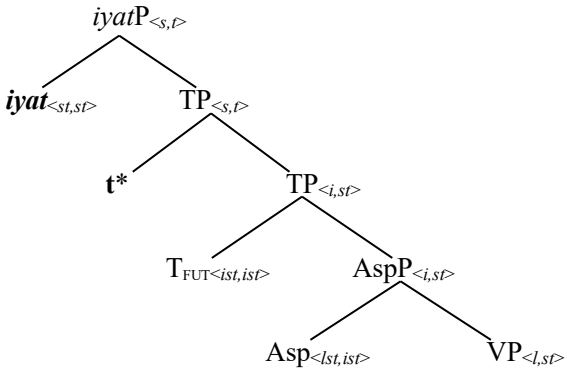


(80) $[\![(77a)]\!]^{g,c} = \lambda w.\ \forall w'\ [w' \in MB_{Meta}(w, t^*)) \longrightarrow \exists t'\ [t^* < t'\ \&\ \neg\exists e\ [be.heard(e, your.words)(w)\ \&\ \tau(e) \subseteq t']]]$

(80) asserts that in all worlds w′ there is a time t′ when the event of your words being heard does not occur. However, this semantics is too weak – the sentence would be true as long as we find a time after now in which your words are not heard – but this is not the meaning of 'your words will not be heard', which should mean 'there is no time in the future in which your words are heard'. This semantic infelicity is very similar to the long-standing problem of an existential semantics for the English past tense (see Partee 1973: 602); that is, an existential past scoping over a negation would give rise to a trivial reading like that in (80).

Unlike (77a–b) has a wide-scope negator thanks to the external negator *iyat*, the structure and output of which are shown in (81–82). (82) gives the meaning exactly as intended: 'there is no time in the future when I come soon'.

(81)



(82) $[\![(77b)]\!]^{g,c} = \lambda w.\ \neg\exists t'\ [t^* < t'\ \&\ \exists e\ [\text{come.soon}(e, I)(w)\ \&\ \tau(e) \subseteq t']]]$

I have shown that the infelicitous *ini'* in prediction contexts results from the presence of an existential operator over future times in the lexical semantics of *musa'*, causing it to scope over *ini'* and render the sentence trivially true. However, there is another way to convey forward semantics. According to Abusch (1998), it can be given by a right open interval, represented by [t, _), which has t as its initial subinterval and extends to the end of time. Condoravdi (2002) extends this idea to all circumstantial modals, which she proves are necessarily shifted into the future, and subsequent studies have shown that this holds across languages (see, e.g., S. Chen et al. 2017). I argue that [t, _) is encoded in the future-oriented modals, except those of predication, and when *ini'* falls under their scope, we get the correct reading. To illustrate, (83) (repeated from (14)) has the deontic possibility modal *nway* with the denotation in (84), where the accessible worlds are selected by a circumstantial MB and further ranked by norms, and is computed as in (85): the event of watering vegetables does not take place in [t*, _), i.e., at any time after the present.

(83) ***nway**=ta'* ***ini'*** *p-qsya'-i* *kira'* *la.*
DEON.POS=1PL.ERG NEG CAUS-water-PV.NEG later.today COS
'We don't need to water the vegetables today.' or 'We may not water the vegetables today.'

(84) $[\![nway]\!]^{g,c} = \lambda P_{<i,st>}\ \lambda t\ \lambda w.\ \exists w'\ [w' \in MB_{CIRC}(w, t))\ \&\ P(w')([t, \_))]$

(85) $[\![(83)]\!]^{g,c} = \lambda w.\ \exists w'\ [w' \in MB_{CIRC}(w, t^*))\ \&\ \neg\exists e\ [\text{water}(e, \text{we}, \text{vegetables})(w)\ \&\ \tau(e) \subseteq [t^*, \_)]]$

Now, let us discuss the present/past reading for *iyat* in combination with the tense NON-FUT, the structure of which corresponds to that in (73a). This reading is predicted as possible by the proposed analysis. However, as discussed in §4.3, this sequence is rarely attested, and the intended reading is expressed by *ini'* scoping under NON-FUT, except perhaps in nominal sentences with an inherent noun in the predicate (§5.1.2). The two sequences are represented below:

(86) a. [$_{NegP}$ ***iyat*** [$_{TP}$ NON-FUT [$_{AspP}$ [$_{VP}$ ...]]]]
b. [$_{TP}$ NON-FUT [$_{AspP}$ [$_{NegP}$ ***ini'*** [$_{VP}$ ...]]]]

If we compute a sentence with the structure in (86a), for example (87) (the counterpart of (74) with *iyat*), we find that the resulting truth conditions (88d) are the same as those in (76d). The only difference is the point at which the negator is added in the derivation—the last step in (88) but the second step in (76). Therefore, we have two sentence forms with the same meaning, and they are expected to compete with each other.

(87) **iyat cyux mngilis qu laqi' qani.*
NEG PROG.DIST cry.AV ABS child this
Intended for 'This kid is not crying.'

(88) a. $[\![\text{VP}]\!]^{g,c} = \lambda e\ \lambda w.\ \text{cry}(e, \text{this.child})(w)$
b. $[\![\text{AspP}]\!]^{g,c} = \lambda t\ \lambda w.\ \exists e\ [\text{cry}(e, \text{this.child})(w)\ \&\ t \subseteq \tau(e)]$
c. $[\![\text{TP}]\!]^{g,c} = \lambda w.\ \exists e\ [\text{cry}(e, \text{this.child})(w)\ \&\ g(i) \subseteq \tau(e)]$, defined only if no part of g(i) is after t_c
d. $[\![\textit{iyat}\text{P}]\!]^{g,c} = \lambda w.\ \neg\exists e\ [\text{cry}(e, \text{this.child})(w)\ \&\ g(i) \subseteq \tau(e)]$, defined only if no part of g(i) is after t_c

Considering that the external negator *iyat* scopes over the proposition, which can interact with various operator in the sentence, including an in-situ focus (see (71) above), it contrasts with the more specific use of the internal negator *ini'*. According to Grice's maxim of quantity – to give as much information as necessary and no more – we correctly predict that *ini'* is preferred over *iyat* when NON-FUT is used. We also correctly predict that sentences with an inherent noun in the predicate can readily use *iyat*, since *ini'* being of type <*lst,lst*> requires selecting a verb as an argument and thus does not compete with *iyat* in such cases.

In summary, the hypothesis that *iyat* and *ini'* differ solely in syntactic position, along with the distinct lexical semantics of future-oriented modals and semantic and pragmatic principles, effectively captures the observed temporal asymmetries on the surface.

7. Challenges to existing proposals

In this section, I discuss how the new data and generalizations established in this paper call into question two existing hypotheses in the literature, namely that *iyat* and *ini'* differ in terms of their reality status and proximity to events.

7.1 Irrealis vs. realis

Contrary to previous assumptions, my findings demonstrate that *ini'* is not limited to specific temporal contexts: it is frequently used to refer to future events, except in the case of prediction. This challenges the hypothesis that *iyat* and *ini'* are associated with irrealis and realis contexts, respectively. The definition of irrealis encompasses various non-factual events, such as future events, conditionals (including counterfactuals), modality, commands, negation, habitual events, and interrogatives (see Elliot 2000; among others). However, *ini'* is almost always possible in these environments. A reality-based explanation also falls short in capturing the syntactic order of the negators and the future and other modals and the (im)possibility of their co-occurrence in the same clause (§5.2).

7.2 Remote vs. immediate

According to Huang & Davis (1989), *iyat* and *ini'* differ in their relation to the described event: *iyat* negates an opportunity in the past or in the future (e.g., some preparatory or felicity condition), while *ini'* negates the actual execution of an event. This distinction is supported by contrasts like (89a) and (89b), where the situations in which the negators are used are interpreted as a lack of opportunity preventing the event versus a failed attempt.

(89) a. ***yat****=ku* ***qbaq*** *m-kucu'* *iqas* *kucu'*
NEG=1SG.ABS ABIL.AV AV-put.on.shoes new shoes
'I can't wear new shoes.'
Context: "The speaker has as yet made no such attempt [...] Perhaps s/he was not allowed [...] to try putting on the shoes; or it could also be that there was no money with which to purchase the shoes, and hence they were not tried on." (Huang & Davis 1989: 5–6)

b. ***ini'****=ku* *qbaq* *m-kucu'* *iqas* *kucu'.*
NEG=1SG.ABS ABIL.AV AV-put.on.shoes new shoes
'I don't know how to wear new shoes.'
Context: "The speaker has made an attempt to wear new shoes, but for some reason did not succeed."

The proposed explanation for (89) assumes that both uses are in the same temporal reading, possibly in the present tense, as the translation suggests. However, this assumption can be questioned since the form *pqbaq* (with the future prefix *p-*) is also found (90). Thus, (89a) is likely a future reading with a shortened form, where the prevention of the event is a result of the future modality.

(90) ***iyat****=saku'* ***p-qbaq*** *musa'* *wah!*
NEG=1SG.ABS FUT.AV-ABIL go.AV PRT
'I cannot go.'
Context: Respond to an invitation, "I cannot go. I have an appointment with my friends."

The co-occurrence of future and ability modals is not uncommon in languages. While most circumstantial modals are typically future-oriented (Enç 1996; Condoravdi 2002), ability modals naturally have a simultaneous reading (i.e., the embedded event occurs at the same time as the evaluation time) (Stowell 2004: 624). For instance, the ability modal *be able to* must be in the future form when combined with a future time adverb, as in (91). Similarly, in Atayal, as shown in (92), the presence of a future adverb requires the ability verb to be marked with the future modal.

(91) You **will be able to** pass your driving test **next time you take it**. (Quirk et al. 1985: 223)

(92) a. ??***baq****=saku'* *tlubuw* ***babaw****=****nya'****.*
ABIL=1SG.ABS play.AV above=3SG
Intended for 'I am able to play the harmonica in the future.'
b. ***musa'****=saku'* ***baq*** *tlubuw* ***babaw****=****nya'****.*
FUT=1SG.ABS ABIL.AV play.AV above=3SG
'I will be able to play the harmonica in the future.'
Context: I haven't played the harmonica, but I want to claim that I will be able to play once I learn it.

The above discussion shows that the motivation for the difference in proximity to the event in *iyat* and *ini'* can be reduced to a temporal difference between future and non-future events.

However, let us assume for the moment that proximity to events is the condition for using *iyat* and *ini'*. Table 4 summarizes how the properties of the negators are explained under this proposal. As the text in bold indicates, non-experiential past readings for *iyat* and future readings

for *ini'* are not correctly predicted, since *iyat* would not negate the execution of an event and *ini'* would not negate a preparatory condition for an event.

Table 4. (Un)predicted properties of *iyat* and *ini'* in Huang & Davis' (1989) proposal

	Property	Huang & Davis' explanation
iyat	future event (§4.1; §5.1.1)	Prior condition to the event was not satisfied.
	past experience (§4.2)	denying the prior circumstance for event occurrence (p.20)
	past event (§4.2)	**-- (predicted as bad)**
	future state (§4.4)	-- (predicted as good)
	past state (§4.4)	**-- (predicted as bad)**
	equatives (§4.5; §5.1.2)	denial of property/event's applicability to an object (p.12)
ini'	**future** (§4.1; §5.1.1)	**-- (predicted as bad)**
	past event (§4.2)	an attempt not succeed
	present event (§4.3)	realization of the event denied
	past/present state (§4.4)	denying the occurrence of some pivotal event (p.19)

Additionally, the syntactic differences between the two negators discussed in §5.2 are not easily explained as a semantic distinction based on proximity to events. Rather, the concept of event proximity can be better understood as a result of a scopal difference rooted in the syntax of the negators.

8. Conclusion and implications

This study examines the temporal contexts of Atayal *iyat* and *ini'*, both of which serve as candidates for negation in declarative verbal sentences, the so-called standard negation. Comparing their temporal reference with affirmative sentences reveals that both negators can be compatible with any reference time and temporal asymmetries arise from semantic and pragmatic factors. The incompatibility of *ini'* with a future modal is due to semantic infelicity when the non-existence of an event falls within the scope of existential quantification over time. The rarity of *iyat* followed by a temporally unmarked verb is attributed to pragmatic competition with *ini'* when an independently motivated non-future tense is used. The difference between *iyat* and *ini'* is primarily scopal in nature and is reflected syntactically in their placement relative to the verb, tense, and modals, as well as in their order in the same sentence.

The result of this study of Atayal standard negation suggests that external negation in the structural sense is more common in languages than expected. In contrast, in other languages, external negation may be pragmatically conditioned (e.g., Bar-Asher Siegal 2015 for Jewish

Babylonian Aramaic). Another important implication for linguistic variation is that the meaning of negation can be simple, with complexity arising from interaction with other elements in the sentence, or from semantic constraints or pragmatic competition, as the study of the apparent temporal asymmetries in *iyat* and *ini'* shows.

From the Atayal case, we also learn that nominal predicates can serve as excellent diagnostics for external negation, since only external negation can take a wide scope over an equational relation between nominals. The other Atayalic languages, Truku and Seediq, as well as the Formosan languages Puyuma, Kavalan, and Saisiyat are candidates for future study of external negation, as they also have distinct negation for nominal sentences (Lin 2011).

Furthermore, this study sheds light on the typology of negation, showing that languages with two distinct negators for standard negation offer an opportunity to explore the properties of external negation, including finer distinctions in pragmatics and left-peripheral effects. The case study of Atayal negation suggests that scopal differences may be an analytic alternative for choosing between different negators in languages.

Finally, the choice of Atayal *iyat* and *ini'* shows that the two possible analyses of conveying the future can be empirically different. An existential operator may exhibit scopal effects with another operator, while an interval extending to the end of time cannot do so. This finding is significant for understanding future expressions in languages and, as far as I am aware, is the first empirical evidence that future semantics can be lexically distinct. Further cross-linguistic research on this point is needed.

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Abbreviations

ABIL	ability
ABS	absolutive
AV/AV	Actor Voice/actor voice
CAUS	causative
CIRC	circumstantial
CONJ	conjunction
COS	change of state
CTF	counterfactual
CV	circumstantial voice
DEON	deontic
DEP	dependent
DIST	distal
EMP	emphatic
EPIST	epistemic
E.PST	existential past
ERG	ergative
EVID	evidential
EXCL	exclusive
FUT	future
GEN	genitive
HAB	habitual
INCL	inclusive
LV	locative voice
NAV	Non-Actor Voice
NEC	necessity
NEG	negative
NEUT	neutral
NON-FUT	non-future
POS	possibility
PROG	progressive
PRT	particle
PV	patient voice
STAT	stative
VBZR	verbalizer

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Silent determiners and pluractional sequence comparatives in Mandarin Chinese

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This article provides an in-depth examination of pluractional sequence comparatives in Mandarin Chinese, where two parallel nominal *yi*-classifier phrases serve as comparison items. The construction encompasses five crucial features: the necessity of a plural entity in the outermost position, the mandatory use of the numeral word *yi* 'one', the possibility of using different types of classifiers, the adjacency requirement between the two *yi*-classifier phrases, and the implication of multiple successive comparisons. The article posits that each *yi*-classifier phrase incorporates a silent determiner contributing to the construction's meaning. Specifically, the first phrase houses a universal determiner, while the second contains a spatio-temporal determiner with a hidden pronominal argument bound both syntactically and semantically by the first. The analysis contends that pluractional sequence comparatives trigger a sequence pluralization operation, applicable to properties of individuals, times, locations, and events. All five key properties of the construction are argued to emanate from the interplay of the two silent determiners and sequence pluralization operators, offering the first formal analysis of the construction in the literature. The proposed analysis implies that while pluractional comparisons may manifest differently across languages, they share comparable universal mechanisms and semantic tools for interpretation.

Keywords: pluractional comparisons, sequence comparatives, silent determiners, sequence pluralization

1. Introduction

Bi-comparatives have been an important topic of research in Chinese linguistics for decades.[1] One unique feature of *bi*-comparatives is the use of two parallel nominal phrases in the form of "*yi*-Cl(assifier) *bi yi*-Cl(assifier)", where the first *yi*-Cl is the target, and the second is the standard of comparison. This is illustrated by examples (1) through (4) below.

(1) *Ru xia yilai tianqi yi tian bi yi tian re*
enter summer since weather one day than one day hot
'Since summer, the weather has been getting hotter each day.'

[1] For a recent review, see Lin (2022).

(2) *Zhangsan yi ci bi yi ci (geng) shangxin*
Zhangsan one time than one time more sad
'Zhangsan gets sadder and sadder each time.'

(3) *Tamen jia de haizi yi ge bi yi ge gao*
their family DE children one CL than one CL tall
'Each child in their family is taller than the last one.'

(4) *Suiran li jia yi zhan bi yi zhan geng yuan, tiaojian*
though away.from home one stop than one stop more far condition
yi chu bi yi chu geng cha, dan xinnian yi nian bi yi nian
one place than one place more bad but belief one year than one year
geng jianding
more firm
'Although every stop is further than the previous/last one, and the conditions are worse at each place, our belief grows firmer every year.'

Previous studies such as Lü (1992) and Li (1986) have pointed out that sentence patterns like (1–4) compare multiple things sequentially, and the degree of intensity increases progressively. In this article, I shall refer to this construction as the "*yi*-Cl_1 *bi yi*-Cl_2" construction or pluractional sequence comparatives (hereafter PSCs). This construction typically begins with a plural XP phrase, such as *ruxia yilai* 'since summer' in (1) and *tamen jia de haizi* 'the children of their family' in (3), that is associated with the two "*yi*-Cl" phrases. If an explicit plural XP is absent from the structure, a covert one that has been previously mentioned or is relevant in the context can always be inferred, as in (2) and (4). In (2), the implicit plural entity is something like *na/zhe ji ci* meaning 'those/these several times', and in (4) *naxie/zhexie zhan/difang* meaning 'those/these stops/places.' This property, along with four others identified in previous studies, defines the "*yi*-Cl_1 *bi yi*-Cl_2" construction. These five properties are listed in (5) below. Previous studies on this construction include works by Lu (1988); Xiang (1993); Chen (2002); Xu (2005); Liu (2005); Xiaoli Wu (2010); Qingqing Wu (2011); Weishan Wu (2011); Yuan (2012); Lü (2013); Chen & Zhao (2015); Li (2019).

(5) *Properties* of the "*yi*-Cl_1 *bi yi*-Cl_2" construction:
(a) The construction requires an overt plural entity or a covert one retrievable from the context that is associated with the two *yi*-Cl phrases.

(b) The numeral word preceding the classifier can only be *yi* meaning 'one', not other numerical words.
(c) The classifier can be a time classifier, an event classifier, an individual classifier, or a location classifier.[2]
(d) The two *yi*-Cl phrases refer to adjacent individuals in a sequence.
(e) The construction expresses multiple successive comparisons with an increasing degree of quality expressed by the gradable predicate.

Property (5b) is observed in all examples in (1–4). Property (5c) is demonstrated by the use of different classifiers in examples (1–4). Property (5d) can be nicely illustrated by example (1), where the two nominal *yi*-Cl phrases must refer to consecutive days. For example, if the second *yi*-Cl refers to July 20, 2023, then the first *yi*-Cl refers to July 21, 2023. Lastly, property (5e) can be demonstrated by comparing the height of four children in a family, denoted as *a*, *b*, *c*, and *d*. Example (6) conveys the following successive comparisons:

(6) *Tamen jia de haizi, yi-ge bi yi-ge gao*
= *b* is taller than *a*, *c* is taller than *b*, *d* is taller than *c*.

Liu (2005) generalized the meaning of the "*yi*-Cl_1 *bi yi*-Cl_2" construction as follows:

Assuming that the set X consists of elements x_0, x_1, x_2, x_3,…x_n, where these elements can denote specific individuals or points in time on the timeline, the grammatical meaning of the expression "*yi*-Cl *bi yi*-Cl" can be expressed as follows: $x_1 > x_0 \wedge x_2 > x_1 \wedge x_3 > x_2 \wedge \ldots\ldots x_n > x_{(n-1)}$. This can be succinctly represented as $x_n > x_{(n-1)}$ with $n > 0$. (Liu 2005: 25) (Author's translation.)

In other words, for the "*yi*-Cl_1 *bi yi*-Cl_2" construction to convey a comparative meaning, the set of elements being compared must have an ordered structure.

An assumption that is commonly held by scholars working on PSCs is that pluractional sequence comparisons occur when the *yi*-Cl phrases are time-related. For instance, when the classifier of *yi*-Cl is *nian* 'year', *yue* 'month', *ri* 'day', or a verbal classifier such as *ci* 'time', *tang* 'time', the "*yi*-Cl_1 *bi yi*-Cl_2" construction is interpreted as multiple sequence comparisons. Interestingly, Xiang (1993) has pointed out that this construction can also have an additional non-comparative universal meaning. According to Xiang, when the classifier is an individual

[2] The location classifier is added by the author.

classifier or the sentence lacks a temporal category, the construction conveys a non-comparative universal claim rather than a statement of actual comparisons. This is demonstrated in the following examples from Xiang (1993: 42):

(7) a. *Bu yao gen zhexie ren dajiaodao, tamen yi-ge bi yi-ge huai*
not want with these people make.friends they one-CL than one-CL bad
'Do not make friends with these people. They are all bad.'

b. *Yuanzi li de shu zhang de yi-ke bi yi-ke gaoda*
garden in DE tree grow DE one-CL than one-CL tall.and.big
'The trees in the garden are all tall and big.'

However, even when the referents denoted by the two *yi*-Cl phrases with an individual classifier do not have a natural temporal order, the "*yi*-Cl_1 *bi yi*-Cl_2" construction can still convey a comparative, degree-increasing reading. For example, (8) can express a real comparison between the three boxes that co-exist in the same space at the same time.

(8) *Zhe san-ge xiangzi, yi-ge bi yi-ge da*
these three-CL box one-CL than one-CL big
'Each of these three boxes is bigger than the other.'

This indicates that all types of classifiers, including individual classifiers, can give rise to a true sequence comparative reading.

In fact, some examples can be considered ambiguous between the pluractional sequence comparison reading and the non-comparative universal reading, such as example (3), depending upon whether the children are regarded as forming a sequence. In this article, our main focus will be on the comparative reading of PSCs, but we shall touch upon the non-comparative reading in the concluding section, showing that the two readings can be derived as a parametric selection of silent determiners.

Although previous studies on pluractional sequence comparatives in Chinese have provided a solid descriptive foundation for further exploration of this construction, all existing publications on this construction are in Chinese and have been published in mainland China, making them less accessible to Western linguists. This article aims to bridge this gap by presenting the topic in English, and offering the first formal analysis of this topic within the framework of modern formal syntax and semantics.

To fully comprehend the meaning of pluractional sequence comparatives, it is necessary to elucidate how multiple comparisons and sequence readings are derived from the meanings of the construction's individual components and their combination in syntax. This raises several questions, such as whether the two *yi*-Cl phrases are syntactically identical and whether their interpretations are indefinite or definite, existential, or universal. In this article, we shall attempt to answer these questions, explain the five properties of PSCs, and discuss how the comparative and non-comparative readings are related under the same framework.

2. English pluractional comparisons

To facilitate our analysis of PSCs, it is useful to begin by examining English pluractional comparisons and introducing the necessary concepts. Although English does not have an exact equivalent to the Chinese PSC construction, it uses expressions such as *day by day* and *Adj-er…every time* to convey similar ideas. To illustrate, we compare Chinese examples in (9) with English examples in (10).

(9) a. *Otto yi-ci bi yi-ci pao de kuai*
Otto one-time than one-time run DE fast
'Otto ran faster every time.'
b. *Tianqi yi-tian bi yi-tian re*
weather one-day than one-day hot
'The weather is getting hotter day by day.'

(10) a. Otto ran faster every time. (Beck 2012: 83)
b. The weather is getting hotter day by day.

In the subsequent discussion, we provide a summary of Beck's (2012) analysis of "universal comparatives" (10a), and introduce the semantic concepts necessary for their analysis, which will also be utilized to analyze PSCs in Chinese.[3]

Beck (2012) incorporates the concepts of plurality and distributivity into her work, building upon the ideas proposed in Link (1983), Schwarzschild (1996), and Beck & von Stechow (2007). Link (1983) introduces the pluralization operator, denoted by an asterisk (*), to pluralize one-place predicates and capture cumulative or distributive readings. It maps a set of atomic individuals to a set of plural individuals that are composed of them.

[3] We suggest that the reader refer to Beck & von Stechow's (2007) analysis of "pluractional adverbs".

(11) Let P be a set of atomic individuals, i.e., type <e,t>. Then *P is the smallest set such that:
a. $P \subseteq {}^*P$
b. If $\alpha \in {}^*P$ and $\beta \in {}^*P$, then also $\alpha \cup \beta \in {}^*P$.

For example, if the extension of the verb *leave* is {ZS, LS}, then the extension of **leave* is {ZS, LS, ZS ∪ LS}. Thus, if *Zhangsan and Lisi leave* is true, then *Zhangsan* leaves and *Lisi* leaves.

Although distributivity is typically limited to atomic individuals, Schwarzschild (1996) provides evidence that distributivity can also apply to non-atomic individuals. For instance, shoes are commonly sold in pairs, so the sentence *The shoes cost $50* should be interpreted as referring to the cost of each salient plurality, i.e., each pair of shoes, rather than the cost of each individual shoe, or all the shoes together.[4] To account for this, Schwarzschild proposes modifying the D(istributivity)-operator[5] to be anaphoric to salient covers, which are partitions of a plural individual that identify what is most relevant or salient in a given context.[6] Whenever a plurality can be divided into distinct subsets such as pairs of shoes, non-atomic distributivity can be allowed. In count domains, singular atoms are salient in almost all contexts.

The definition of Cover used below is adapted from Beck & von Stechow (2007: 219).

(12) Cover (mereological version):
Cov is a cover of x if Cov is a set such that $\Sigma\, Cov = x$.[7]

(13) a. A cover Cov is a partition iff for any x, y ∈ Cov: x and y do not overlap.
b. PART(Cov, x):= 1 iff Cov is a partition (and a cover) of x.

(14) $Cov[x] = \{y: y \in Cov \;\&\; y \leq x\}$

Note that the symbols "Cov[x]" and "Cov(x)" have different meanings. While the former refers to the set of all the members of Cov, the latter asserts that x is a member of Cov.

Building upon the concept of "Cover" and the pluralization operator, Beck & von Stechow (2007) and Beck (2012) introduce a new pluralization operator symbolized as "PL^{seq}". PL^{seq} is a sequence pluralization operator that imposes a sequence requirement on the pluralities. (15) illustrates the use of the sequence pluralization operator for pluralizing properties of events.

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4 This example is Lasersohn's (1998: 88).

5 That is, $[\![D]\!] = \lambda P_{<e,t>}\lambda x \forall y[y \leq x \wedge Atom(y) \rightarrow P(y)]$.

6 Schwarzschild refers to this revised distributivity operator a Part operator, whose definition is: $[\![Part_c]\!] = \lambda P_{<e,t>}\lambda x \forall y[y \leq x \wedge C(y) \rightarrow P(y)]$.

7 ΣM is the fusion of the elements of M if it has all of them as parts and has no part that is distinct from each of them. If M is the finite set $\{x_1,\ldots,x_n\}$, ΣM equals $x_1+\ldots+x_n$.

(15) $[\![PL^{seq}]\!] = \lambda Cov.\lambda P_{<v,t>}.\lambda E_{<v>}.Cov[E]$ is a sequence & $E \in [{}^*\lambda e.Cov(e)\ \&\ P(e)]$

Let us assume that there is a plural event $E = e_1 \cup e_2 \cup e_3$, and $P = \{e_1, e_2, e_3\}$ represents a sequence. What the operator in (15) does is to pluralize P, creating a resulting predicate that can be true for the fusion of the three subevents, i.e., the entire event E; In other words, $[PL^{seq}(P)](E)$ is true if and only if $\{e_1, e_2, e_3\}$ is a sequence, and e_1, e_2, and e_3 are all elements of P.

The sequence pluralization operator can also be applied to properties of individuals of different types. For example, when P is of type <e,t> instead of <v,t>, "PL^{seq}" pluralizes properties of individuals.[8]

To analyze English universal comparatives, we need to introduce two additional concepts from Beck & von Stechow (2007): relevant predecessor events and individuals, as well as the definition of a sequence. Their definitions are provided below:

(16) ordering relation on events:
e is before e': $e \angle e'$ iff $\tau(e) < \tau(e')$

(17) the immediate predecessor of e:
$Pred(e) = \iota e'$: $e' \angle e\ \&\ \forall e''\ [e'' \angle e \rightarrow e'' = e'$ or $e'' \angle e']$

(18) ordering relation on individuals:
$x \angle y$ iff $\exists e[x$ is in e and $\forall e'$ [y is in $e' \rightarrow e \angle e']]$
x is before y iff x occurs in a relevant event before y does.

(19) the immediate predecessor of x:
$Pred(x) = \iota y$: $y \angle x\ \&\ \forall z\ [z \angle x \rightarrow z = y$ or $z \angle y]$

(20) Cov[x] is a sequence iff $Cov[x] = \{x_1,\ldots x_n\}$ and for any x_i, x_{i+1}: $x_i \angle x_{i+1}$
e.g., Cov[these 3 dogs] = $\{x_1, x_2, x_3\}$ such that for any x_i, x_{i+1}: $x_i \angle x_{i+1}$: {D1,D2,D3}

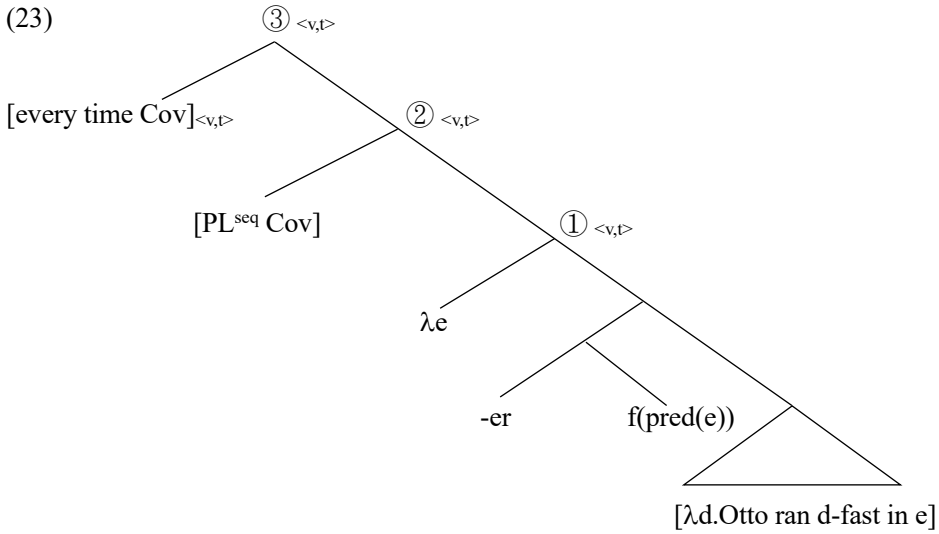
(21) $Cov[e] = \{e_1,\ldots e_n\}$ such that for any e_i, e_{i+1}: $e_i \angle e_{i+1}$

[8] Beck's original version of the sequence pluralization operator can handle pluralization of multiple arguments. However, for the sake of simplicity, we only focus on cases where a single argument is pluralized in this article.

With the above concepts, Beck (2012) assumes that the logical form of (10a=22) can be represented as (23) with the time adverbial *every time* in the outermost position:

(22) Otto ran faster every time.

(23)



According to Beck (2012), although the comparative suffix *-er*'s first argument, i.e., the standard of comparison, is not explicitly expressed in (23), it is implicit in the logical representation. This implicit argument is internally complex, as it consists of an event and a function *f* that maps events to the speed within them, as shown below:

(24) a. [-er f(pred(e)) [λd. Otto ran d-fast in e]] = Speed_e(Otto) > f(pred(e))
b. f: e → Speed_e(Otto)
c. Speed_e(Otto) > $\text{Speed}_{\text{pred(e)}}$(Otto)
"Otto ran faster in e than in e's predecessor event."

Once the event variable *e* in (23) is abstracted, the resulting expression is (25), which is a property of events.

(25) ⟦①⟧ = λe. Otto ran faster in e than in e's predecessor event

Afterward, we shall apply the sequence pluralization operator PL^{seq} in (15) to the abstracted property of events in (25). This will yield the expression shown in (26), which is of type <v,t>, denoting properties of plural events:

(26) ⟦②⟧ = [[PL^{seq} Cov]([λe [[-er f(pred(e) [λd.Otto ran d-fast in e])]]])]=
λE.Cov[E] is a sequence & E ∈ *λe.[Cov(e) & $Speed_e$(Otto) > $Speed_{pred(e)}$(Otto)]

The situation can be divided into a sequence of relevant subevents such that in each of them, Otto's speed exceeded his speed in the predecessor event. (Beck 2012: 81)

Next, "*every time Cov*" in (23) needs to combine with node ②. Beck notes that the adverbial *every time* in universal comparatives allows for no exceptions. She proposes analyzing *every time* as functioning similarly to Brisson's (1998) *all*, which requires a good-fitting on the cover. To be more precise, she defines *every time* as a function that takes a cover Cov and an event E as arguments and returns a truth value indicating whether all time/year parts of E are in the cover and whether the union of all the member of Cov is equivalent to the original plural event.

(27) ⟦every time/year⟧ = λCov.λE.∀e ∈ Cov[E]: time/year(e) & ∪Cov[E] = E
"all time/year parts of E are in the cover"
≈ "Cov partitions E into times/year" (Beck 2012: 84)

Once the Cov argument of *every time* is satisfied, an expression of type <v,t> is obtained. As a result, "*every time Cov*" and the pluralized event properties following it in (23) are both expressions of type <v,t>. Therefore, functional application cannot be used here. However, the Predicate Modification rule can be generalized to conjoin two predicates of type <v,t> and create a new predicate of the same type. This resulting property of events can then be used to predicate on a plural event, which is the intended outcome.

(28) ⟦③⟧= [[$_{<v,t>}$ every $time_{Cov}$] [$_{<v,t>}$ [PL^{seq}_{Cov}][λe [[-er f(pred(e)) [λd. Otto ran d-fast in e]]]]]
= λE. Cov[E] is a sequence & ∀e ∈ Cov[E]: time(e) & ∪Cov[E] = E & E ∈ [*λe.Cov(e) & $Speed_e$(Otto) > $Speed_{pred(e)}$(Otto)]] (Beck 2012: 84)

In this analysis, the adverbial *every time* is like an event modifier restricting the event property that it combines with.

3. Theoretical foundation for Chinese comparatives

There have been two primary approaches to Chinese *bi*-comparatives in the literature: the clausal approach, proposed by Liu (1996; 2011; 2014), Hsieh (2017), and Erlewine (2018), and the phrasal approach, which has been adopted by scholars such as the author in Lin (2009; 2022). A comprehensive review of these analyses can be found in Lin (2022). The present article will focus on the author's phrasal approach.

As outlined in Lin (2009; 2022), Chinese *bi*-comparatives are used to compare arguments of gradable predicates. This means that any argument within a gradable predicate's argument structure, whether it be an individual, event, place, and times, or a combination of them, can serve as comparison items. This is demonstrated by the examples below.

(29) a. *Zhangsan bi Lisi gao*
Zhangsan than Lisi tall
'Zhangsan is taller than Lisi.'

b. *Zhangsan zai xuexiao bi zai jia guai*
Zhangsan at school than at home obedient
'Zhangsan is more obedient at school than at home.'

c. *Zhangsan jintian bi Lisi zuotian kaixin*
Zhangsan today than Lisi yesterday happy
'Zhangsan is happier today than Lisi was yesterday.'

d. *Zhangsan zhe ci bi (ta) shang ci geng can*
Zhangsan this time than he last time more miserable
'Zhangsan is more miserable this time than he was last time.'

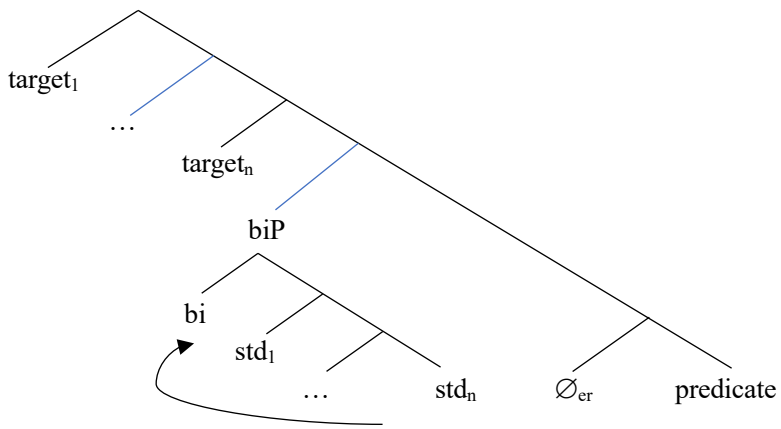
e. *Zhangsan jintian zai xuexiao bi (ta) zuotian zai jiali kaixin*
Zhangsan today at school than he yesterday at home happy
'Zhangsan is happier at school today than he was at home yesterday.'

It is noteworthy that examples of the type found in (29d) and (29e) exhibit a pronoun coindexed with the subject, acting as one of the standard constituents. The grammatical construction parallels the one in (29c), where a comparison is made between *Zhangsan* and *Lisi* with respect to the property of happiness at two different times—today for *Zhangsan* and yesterday for *Lisi*, respectively. The constructions in (29d) and (29e) are similar, but in this case, *Zhangsan* is being compared to himself at two times. This implies that when the coindexed pronoun is absent, an

implicit co-indexed one can be assumed to be present in the structure. We shall employ this analysis to elucidate the semantics of PSCs when we discuss examples involving the verbal classifier *ci*.

In this article, we shall use the author's phrasal approach to investigate Chinese *bi*-comparatives. Following Lin's (2022) framework, we posit that *bi* serves to introduce a series of standard arguments, which comprise an ordered set of *n* elements ($x_1 \ldots x_n$) parallel to a series of target constituents. Syntactically, *bi* raises from a lower head position to a higher one in a shell-structure. The denotation of *bi* is defined as presented in (31b). Additionally, we posit the existence of a silent comparative morpheme, which we shall represent as '$\varnothing_{er}$' throughout this article. Its denotation is given in (32).

(30)



(31) a. $[\![bi]\!] = \lambda x_n \ldots \lambda x_1.\langle x_1, \ldots, x_n\rangle$

b. $[\![biP]\!] = \langle x_1, \ldots, x_n\rangle$

(32) $[\![\varnothing_{er}]\!] = \lambda P_{<d,<e,<\ldots,t>>>} \lambda x_n \ldots x_1 \lambda y_n \ldots y_1 [\iota_{max}\, d[P(d)(y_n)\ldots(y_1)] > \iota_{max}\, d[P(d)\,(x_n)\ldots(x_1)]]$

Drawing from the assumptions laid above, we can derive the meanings of (29a) and (29e) as (33) and (34), respectively.

(33) a. *Zhangsan bi Lisi gao*

b. ι_{max} d.tall(d)(Zhangsan) > ι_{max} d.tall(d) (Lisi)

"Zhangsan's maximal degree of height is greater than Lisi's maximal degree of height."

(34) a. *Zhangsan jintian bi (ta) zuotian kaixin*
b. ι_{max} d.happy(d)(today)(Zhangsan) > ι_{max} d.happy (d)(yesterday)(he)
"Zhangsan's maximal degree of happiness today is greater than his maximal degree of happiness yesterday."

4. The syntax of pluractional sequence comparatives

As mentioned, PSCs usually take the form of "XP …+ *yi*-Cl_1 + *bi* + *yi*-Cl_2 + VP/AP", where VP/AP is a gradable predicate. The XP phrase can be understood as the topic or subject of the sentence, and the entire "*yi*-Cl_1 *bi yi*-Cl_2 VP/AP" sequence predicates on it.

Let us now examine the two *yi*-Cl phrases. According to online sources, the universal quantifier *mei* 'every' can sometimes be placed before the *yi*-Cl_1 phrase without changing the statement's meaning, at least for some speakers. This occurs with different types of classifiers, as demonstrated in the examples below in (35). The online sources of the examples are given below them.

(35) a. *Jiexialai, mei yi tian bi yi tian leng, yifu yi jian bi yi jian chuan de hou*
and.then every one day than one day cold clothes one CL than one CL wear DE thick
'As the temperature gets colder each day, one wears thicker and thicker clothing.' (https://kknews.cc/zh-tw/news/qbkpg8o.html)

b. *Buguo wulun ruhe ni hui kanjian haizi mei yi ci bi yi ci geng hao de biaoxian*
but no.matter how you will see children every one time than one time more good DE performance
'No matter what, you'll see that the children are improving over time with each performance.' (https://mamibuy.com.tw/talk/article/114197)

c. *You mei you fajue guo-le sanshi sui hou*, mei *yi nian bi yi nian shenxing gengjia nan weichi*
have not have discover pass-ASP thirty year after every one year than one year figure more difficult keep
'Have you found that after the age of 30, it is more difficult to keep the figure every year.' (https://www.facebook.com/mikelee40/photos/a.1028001924266533/1028901877509871/?paipv=0&eav=AfYrESf5ytfTqixNzajJJg3dt5I36uzYObbRf8kW)

d. *Cong di yi-zhang zhuanji Yuexingzhe kaishi, ta jihu shi wenbu*
from first one-CL album Voyager starting he almost be steadily
shangsheng de, mei yi-zhang bi yi-zhang geng jingzhi, mei yi-zhang
rise PAR every one-CL than one-CL more refined every one-CL
bi yi-zhang fongge gengjia duo bian, xuanlu gengjia shenru
than one-CL style even.more many vary melody even. more resonate.deeply
ren xin
human heart
'Starting from his first album "Voyager", he has been steadily rising, with each subsequent album becoming more refined and exhibiting greater stylistic diversity, with melodies that resonate more deeply with listeners.'
(https://www.xuehua.us/a/5ec245c40102d20e152bc09e?lang=zh-hk)

On the other hand, the words *qian* or *shang*, which mean "the previous/last", may occasionally come before *yi*-Cl_2. While such examples are not plentiful, and opinions on their grammaticality may vary, they provide insight into the speaker's semantic intuition. Again, I have provided the webpage location for each example in (36).

(36) a. *Jianjiande yi tian bi qian yi tian duo pao ban quan, yi zhou*
gradually one day than previous one day more run half lap one week
bi yi zhou pao de geng duo
than one week run DE more many
'Gradually, I ran half a lap more every day and ran more every week.'
(https://www.yibencezi.com/notes/141495)

b. *Wo ye shi rufapaozhi, yi ci bi qian yi ci shijian la*
I also be follow.routine one time than previous one time time extend
chang
long
'I also follow the routine and increase the duration each time.'
(https://mamibuy.com.tw/talk/article/64569)

c. *Xuduo shihou tamen bixu yi shi-ge huang lai yanshi qian yi-ge*
many times they must with ten-CL lie to cover.up previous one-CL
huangyan, jieguo shi yi-ge bi qian yi-ge hai lipu
lie as.a.result be one-CL than previous one-CL even.more go.too.far
'They often have to tell ten lies to cover up the previous one, causing each subsequent lie to be more absurd than the last.'
(https://www.peoplemedia.tw/news/6b2f44d1-8546-4e7b-89fc-02ba22660467)

d. *Jiu ru zuijin guochan fadongji de re xiaolu, chui*
just like recently domestically-produced engine DE thermal efficiency boast
de shi yi-ge bi shang yi-ge lihai, bu zhidao na yi-ge
DE be one-CL than last one-CL impressive not know which one-CL
xian chui dao 100
first boast reach 100
'Just like recently, the thermal efficiency of domestically-produced engines is being boasted about, with each one claiming to be more impressive than the previous one. We don't know which one will reach 100 first.'
(https://www.geeknev.com/tech/288/2880159.html)

In contrast to the infrequent occurrences of *mei* and *qian* used alone before the *yi*-Cl_1 and *yi*-Cl_2 phrases, respectively, there are numerous examples where both *mei* and *qian* co-occur in the same "*yi*-Cl_1 *bi yi*-Cl_2" construction. Below are some examples that were found online.

(37) a. *Zhiyao women mei yi tian bi qian yi tian geng hao, buguan*
As.long.as we every one day than previous one day more good regardless
da shi xiao shi dou you suo jinbu, na jiu shi mei de
big matter small matter all have SUO progress that then be beautiful DE
'It is a beautiful thing, as long as we make more progress every day, whether that progress is on a big or small matter.'
(http://www.71.cn/2017/0406/942163.shtml)

b. *Zhangwo shuzi cai nenggou manman mei yi ci bi qian yi*
grasp number only can slowly every one time than previous one
ci jinbu
time progress
'One can make progress each time only when they have a firm grasp of numbers.'
(https://vocus.cc/article/619f9b66fd89780001dd45b5)

c. *Danshi shijishang zhe-ge saidao you wushu-ge juli zucheng, erqie*
but in.fact this-CL track from countless-CL distance constitute and
mei yi-ge bi qian yi-ge chang
every one-CL than previous one-CL long
'In fact, this track is composed up of countless segments, each one longer than the last.'
(https://zhuanlan.zhihu.com/p/100122717)

d. *Zheli you daliang butong de jingguan, mei yi chu dou bi qian*
here have lots.of different DE landscape every one place all than previous
yi chu geng meili
one place more beautiful
'There are many different landscapes here and each one is more beautiful than the last.'
(https://kknews.cc/zh-tw/travel/azeojag.html)

The examples listed in (35) through (37) suggest that there may be a silent universal quantifier in the *yi*-Cl_1 phrase and an empty spatio-temporal determiner in the *yi*-Cl_2 phrase. In this article, I shall use "$\varnothing_{every}$" and "$\varnothing_{last}$" to stand for the two silent determiners, respectively.

There is evidence to support the existence of a silent universal quantifier in the "*yi*-Cl_1" phrase. In Mandarin Chinese, normally, the adverb *dou* 'all' is required with the universal quantifier *mei* 'every,' as in the sentence *mei-ge ren *(dou) hen congming*, meaning 'everyone is smart.' Importantly, as shown by various online examples, *dou* can sometimes appear after *yi*-Cl_1, though grammaticality judgments are subject to variations based on the speaker.

(38) *Xiandai shehui renmen dui wuzhi de zhuiqiu shi yi tian dou bi yi*
modern society people to material DE pursuit EMP one day all than one
tian gao
day high
'In modern society, people's pursuit of material possessions is increasing day by day.'
(https://ppfocus.com/0/pebc55d79.html)

(39) *Suiran yi ci dou bi yi ci jinbu, danshi yao jiang qi*
Though one time all than one time make.progress but want make it
zuo de piaoliang zhende hen nan ne
do DE beautiful really very difficult PAR
'Even though we are making progress every time, it is very difficult to do so gracefully.'
(http://www.chiashih.com/23526327223(52063898820108.html)

(40) *Zhongguo xinniang yuanlai yi-ge dou bi yi-ge piaoliang*
Chinese bride turn.out one-CL all than one-CL beautiful
'Every Chinese bride is more beautiful than another.'
(https://mojim.com/twy101353x8x6.htm)

Additional and more robust evidence supporting the universality of the "*yi*-Cl_1" comes from the fact that the adverb *jihu* 'almost', which is typically used with universal expressions, can appear before *yi*-Cl_1.

(41) a. *Ben zhou jihu yi tian bi yi tian hai re*
this week almost one day than one day more hot
'It has been getting hotter almost every day this week.'
(https://www.merit-times.com/NewsPage.aspx?unid=306774)

b. *Yishang jiu shi zhe si-wei meinü de zuihou jieju, jihu yi-ge bi yi-ge can*
above EMP be this four-CL beauty DE final ending almost one-CL than one-CL miserable
'The above is the final ending of the Four Beauties, each of whom had a more tragic fate than the last.'
(https://www.sohu.com/a/486408627_121080240)

c. *Cong di er lun kaishi, ta jihu yi-ci bi yi-ci wanmei*
from the second round begin she almost one-time than one-time perfect
'From the second round onwards, she became almost more perfect every time.'
(https://sports.sohu.com/20060720/n244361539.shtml)

As for the syntax of the *yi*-Cl_2 phrase, it is important to note that the morpheme *qian* requires a reference argument to determine the meaning of the phrase *qian yi-ge* 'the previous/last one'. This reference argument can be expressed overtly by using a constituent such as the word *shengdanjie* 'Christmas' in the phrase *shendanjie qian yi tian* 'the day before Christmas', where *qian yi-tian* refers to the day that immediately precedes Christmas instead of any other 24 hours. If an overt reference argument is not present, a covert pronominal argument is assumed to be present in the structure. To represent this, the author uses the symbol "$\varnothing_{pro}$" to represent the silent or hidden pronominal reference argument of *qian* 'previous'.

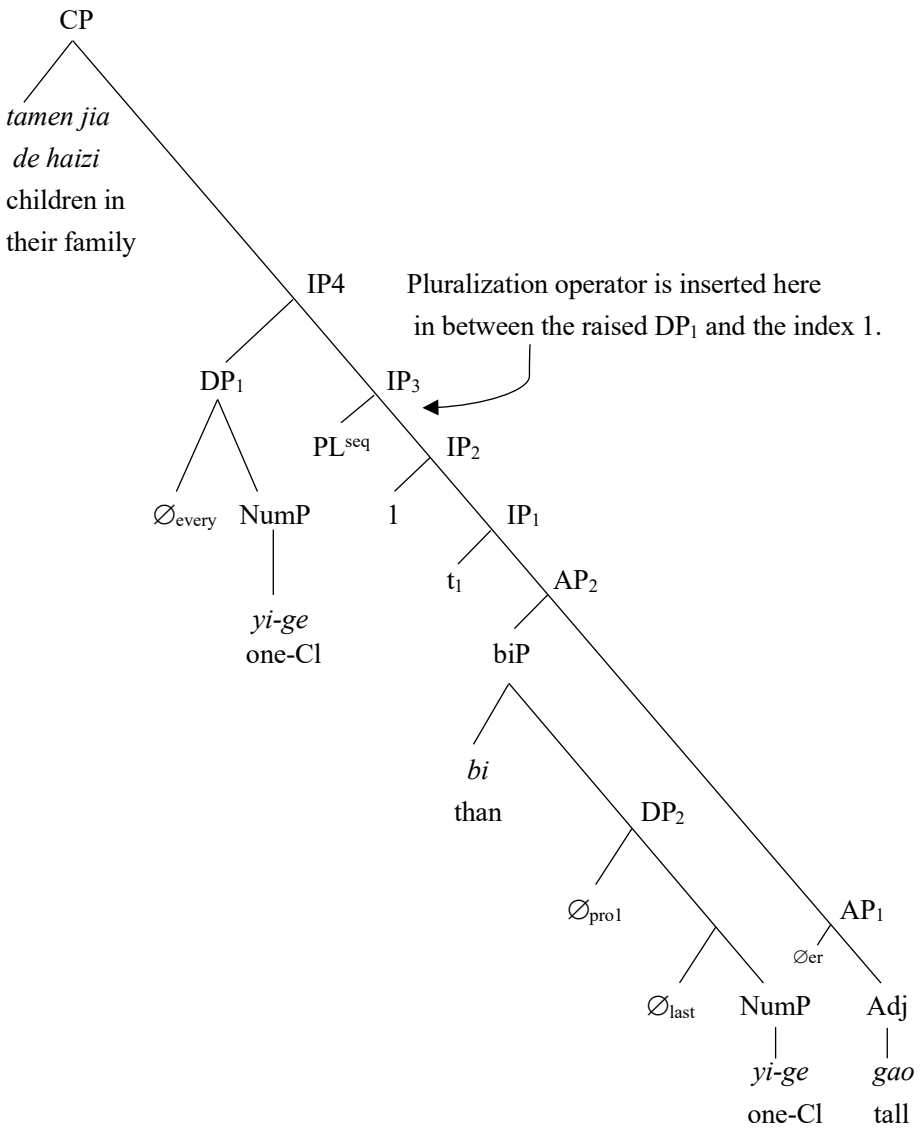
The author proposes that the empty spatio-temporal determiner "$\varnothing_{last}$" also requires a reference argument, albeit a covert pronominal one, which is both syntactically and semantically bound by the "$\varnothing_{every}$ *yi*-Cl" phrase. Therefore, the structure of "*yi*-Cl_1 *bi yi*-Cl_2" should be more accurately represented as shown in (42).[9]

[9] It should be emphasized that the idea of a complex structure featuring a hidden pronominal argument is not an outdated or unusual one. Several scholars, including Cooper (1979), Chierchia (1993), von Fintel (1994), Martinez-Marti (2003), and Beck (2012), have proposed similar theories for different structures.

(42) $[[_{DP}\ \varnothing_{every}$ yi-Cl$]_1$ [bi $[_{DP}\ \varnothing_{pro1}\ [\varnothing_{last}$ yi-Cl$]]_2\ \varnothing_{er}$-predicate]]

If we further posit that the phrase "$\varnothing_{every}$ *yi*-Cl" undergoes quantifier raising and pluralization applies to its sister, this results in the logical representation in (43) in Heim & Kratzer (1998)'s style of representation, i.e., the index of a moved constituent is treated as a lambda abstractor. (43) then becomes the input to semantic interpretation.

(43)



5. The semantics of Chinese pluractional sequence comparatives

5.1 The relation between "$\varnothing_{every}$" and "$\varnothing_{last}$"

Let us start by examining the connection between the silent universal quantifier "$\varnothing_{every}$" and the empty determiner "$\varnothing_{last}$" before presenting a step-by-step computation of tree (43). As we discussed in the previous section, the interpretation of the latter is dependent on the former since the hidden pronominal argument of the latter is bound by the former. An anonymous reviewer has noted that this relationship bears resemblance to Shi-Zhe Huang's proposal of the distributive universal quantifier *mei* in a series of works (Huang 1996; 2005; 2022a; 2022b). According to Huang's observation, a subject or topic *mei*-phrase requires *dou*, an indefinite or a reflexive in its predicate, in order for the sentence to be grammatical. The following examples taken from Huang (2022b: 221) illustrate this point.

(44) a. **Mei-ge* *xuesheng* *biye-le*
every-CL student graduate-ASP
'Every student graduated.'

b. *Mei-ge* *xuesheng* *dou* *biye-le*
every-CL student dou graduate-ASP
'Every student graduated.'

c. *Mei-ge* *chushi* *(dou)* *zuo-le* *yi-dao* *cai*
every-CL chef dou make-ASP one-CL dish
'Every chef made a dish.'

d. *Mei-ge* *haizi* *(dou)* *you* *ziji-de* *mengxiang*
every-CL child dou have self-POSS dream
'Every child has their own dreams.'

Huang argues that the three co-occurring partners of *mei*-phrases share a common feature; they establish a correspondence between two variables such that for every *x* there exists a *y*, where *x* and *y* are the paired variables (Huang 2022b: 222). The restrictor of the *mei*-phrase introduces variable *x*, while either a predicate (event variable), an indefinite (individual variable) or a reflexive (individual variable) introduces variable *y*. Huang terms this requirement for distributive universal quantifiers the "Double Variable Hypothesis". The reviewer suggests that the "*yi*-Cl_1 *bi yi*-Cl_2" construction is another instance of this hypothesis, presuming that the second "*yi*-Cl" phrase introduces variable *y*.

It should be noted that similar to an indefinite DP, the NP restrictor of any definite DP introduces a variable.[10] Nevertheless, this variable cannot be considered as variable *y* for the purpose of the Double Variable Hypothesis, as Huang has already established in her previous works. If this variable were to be considered as variable *y*, then it would be unclear why *dou* and its associated event variable are required in (45a), in comparison to (45b).

(45) a. *Mei-ge* *ren* **(dou)* *du-le* *na* *liang-ben* *shu*
every-CL person all read-ASP that two-CL book
'Everyone read those two books.'
b. *Mei-ge* *ren* *du-le* *liang-ben* *shu*
every-CL person read-ASP two-CL book
'Everyone read two books.'

In (45a), the reference of the definite description *na liang-ben shu* 'those two books' remains constant, whereas in (45b), the reference of the indefinite description *liang-ben shu* 'two books' co-varies with the *mei*-phrase. As a result, everyone reads the same two books in (45a), whereas in (45b), everyone reads two different books.[11] This discrepancy between (45a) and (45b) suggests that the Double Variable Hypothesis requires a co-varying variable *y* whose value changes with the value assigned to variable *x*. Therefore, not all variables can serve the purpose of the Double Variable Hypothesis.

Shortly, we shall discuss how "$\varnothing_{last}$" bears a resemblance to a definite determiner. Nevertheless, the containing phrase "[$_{DP}$ $\varnothing_{pro}$ $\varnothing_{last}$ *yi-ge*]", which denotes the immediate predecessor of "$\varnothing_{pro}$", does not imply a single referent, as the silent pronominal argument "$\varnothing_{pro}$" can take on distinct values from the variable bound by "$\varnothing_{erery}$". In this sense, "[$_{DP}$ $\varnothing_{pro}$ $\varnothing_{last}$ *yi-ge*]" has a variable that varies and can match with the variable bound by "$\varnothing_{every}$".[12]

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[10] For example, Russell (1905) proposed that a sentence in the form of "The F is G" containing a definite description is understood to have the logical form in (i):

(i) $\exists x(Fx \,\&\, \forall y(Fy \rightarrow x = y) \,\&\, Gx)$

[11] According to Wu (2013) and Lin (2020), when *dou* is absent, the co-varying interpretation is obligatory.

[12] As Huang suggests, the reflexive in (44d) functions as a matching variable. Therefore, we can also consider the hidden pronoun in "[$_{DP}$ $\varnothing_{pro}$ $\varnothing_{last}$ *yi-ge*]" as a matching variable since they play the same roles in making their containing noun phases dependent on the *mei*-phrase for interpretation.

5.2 Semantic computation of PSCs

Before exploring the details of computing the "*yi*-Cl_1 *bi yi*-Cl_2" construction, it is necessary to establish some lexical entries. We need to define the semantic meanings of three lexical items: numeral-classifier, "$\varnothing_{last}$" and "$\varnothing_{every}$".

In the literature, numerals are often viewed as intersective predicates of type <e,t>. Following this tradition, we propose that numeral classifier sequences are also expressions of type <e,t>, with the classifiers serving as measuring/counting units for objects or individuals. For instance, the denotation of *yi-ge* 'one-Cl' is as follows, where OU_{Cl} represents a measuring function and the counting unit is the one specified by the classifier.

(46) $[\![\text{yi-ge}]\!] = \lambda x.\ \text{individual}(x) \wedge OU_{ge}(x) = 1$

Let us take a closer look at the semantics of "$\varnothing_{last}$". As previously mentioned, the function of "$\varnothing_{last}$" is to identify the immediate predecessor of the hidden pronominal argument as the reference of the "*yi*-Cl_2" phrase. This function is achieved through (47), which combines the numeral-classifier and the pronominal argument to return the immediate predecessor of the pronominal argument.

(47) $[\![\varnothing_{last}]\!] = \lambda P_{<e,t>}\lambda x_e.\iota y[P(y) \wedge y \angle x\ \&\ \forall z\ [z \angle x \rightarrow z = y \text{ or } z \angle y]]$

It is important to note that although the analysis of "$\varnothing_{last}$" in (47) involves the definite operator "*ι*", it does not imply uniqueness in the traditional sense. As explicitly stated in (47), "ιy" refers to the entity immediately preceding the referent of the variable *x*, which is the hidden pronoun in the "*yi*-Cl_2" phrase. Since the reference of the silent pronoun varies with the value assigned to the variable *x* bound by "$\varnothing_{every}$", "ι*y*" refers to a different entity every time a different value is assigned to the variable *x*. However, "ιy" can be considered definite as there is only one *y* for each value assigned to the variable *x*, making it unique. Therefore, "$\varnothing_{last}$" can be seen as a relatively definite determiner with a silent pronominal argument. The variable *y* bound by "*ι*" has a varying reference due to this hidden pronoun, and can fulfill the purpose of the Double Variable Hypothesis. Furthermore, the proposed analysis explains the immediate adjacency requirement of the *yi*-Cl_2 phrase as a consequence of the meaning of "$\varnothing_{last}$" and the hidden pronoun bound by "$\varnothing_{every}$ *yi*-Cl_1".

Now, let us shift our focus to the denotation of "$\varnothing_{every}$" and "$\varnothing_{every}$ *yi*-Cl". However, before delving into that, let us first go through a step-by-step computation of the tree structure (43) up to node IP_3. For the sake of convenience, I provide the labeled and bracketed version of the tree structure (43) below.

(48) $[_{CP}$ TJDH $[_{IP4}$ ($\varnothing_{every}$ yi-ge) $[_{IP3}$ (PL^{seq} Cov) $[_{IP2}$ λ_1 $[_{IP1}$ t_1 bi ($\varnothing_{pro1}$ $\varnothing_{last}$ yi-ge) $[_{AP}$ $\varnothing_{er}$ gao]]]]]]

The step-by-step computation of (43 = 48) up to node IP_3 is as follows:

(49) a. $[\![AP_1]\!]^g = [\![\varnothing_{er}\ gao]\!]^g = \lambda y \lambda x[\iota_{max}\ d[P(d)(x)] > \iota_{max}\ d[tall(d)\ (y)]]$

b. $[\![DP_2]\!]^g = [\![[\varnothing_{pro1} \varnothing_{last}\ yi\text{-}ge]]\!]^g$

c. $[\![yi\text{-}ge]\!]^g = \lambda x.\ individual(x) \wedge OU_{ge}(x) = 1$

d. $[\![\varnothing_{last}]\!] = \lambda P_{<e,t>} \lambda x_e.\iota y[P(y) \wedge y \angle x\ \&\ \forall z\ [z \angle x \rightarrow z = y \text{ or } z \angle y]]$

e. $[\![[\varnothing_{pro1}\ \varnothing_{last}\ yi\text{-}ge]]\!]^g = \iota y[\ individual(y) \wedge OU_{ge}(y) = 1 \wedge y \angle [\![\varnothing_{pro1}]\!]^g\ \&\ \forall z\ [z \angle [\![\varnothing_{pro1}]\!]^g \rightarrow z = y \text{ or } z \angle y]]$

(= the immediate predecessor of $[\![\varnothing_{pro1}]\!]^g$)

f. $[\![biP]\!]^g = [\![biDP_2]\!]^g = [\![DP_2]\!]^g = [\![[\varnothing_{pro1}\ \varnothing_{last}\ yi\text{-}ge]]\!]^g$

g. $[\![AP_2]\!]^g = \lambda x[\iota_{max}\ d[tall(d)(x)] > \iota_{max}\ d[tall(d)$ (the immediate predecessor of $[\![\varnothing_{pro1}]\!]^g$)]]

h. $[\![IP_1]\!]^g = [\iota_{max}\ d[tall(d)([\![t_1]\!]^g)] > \iota_{max}\ d[tall(d)$ (the immediate predecessor of $[\![\varnothing_{pro1}]\!]^g$)]]

i. $[\![IP_2]\!]^g = \lambda x.[\ [\iota_{max}\ d[tall(d)([\![t_1]\!]^{g[1/x]})] > \iota_{max}\ d[tall(d)$ (the immediate predecessor of $[\![\varnothing_{pro1}]\!]^{g[1/x]}$)]]

$= \lambda x.[\ [\iota_{max}\ d[tall(d)(x] > \iota_{max}\ d[tall(d)$ (the immediate predecessor of x)]

= λx. the maximal degree d of x's height is greater than the maximal degree of height of the immediate predecessor of x

j. $[\![IP_3]\!]^g = [\![PL^{seq}Cov]\!]^g\ ([\![IP_2]\!]^g)$

= λX.Cov[X] is a sequence & X ∈ [*λx. the maximal degree d of x's height is greater than the maximal degree of x's immediate predecessor] (This is an expression of type <e,t>)

When we move to node IP_4, we need to combine "[$\varnothing_{every}$ *yi-ge*]" with the denotation of node IP_3 presented in (49j), which is a type <e,t> expression that predicates on a plural entity. To incorporate the contribution of "[$\varnothing_{every}$ *yi-ge*]", we may interpret it as a standard generalized quantifier of type <<e,t>,t> as in (50b). When this generalized quantifier meaning is combined with the denotation of node IP_3, this leads to the outcome shown in (50c).

(50) A first attempt to interpret node IP_4

a. $[\![\varnothing_{every}]\!]^g = \lambda P_{<e,t>} \lambda Q_{<e,t>} \forall x[P(x) \rightarrow Q(x)]$

b. $[\![[\varnothing_{every}\ yi\text{-}ge]]\!]^g = \lambda Q_{<e,t>} \forall x[(individual(x) \wedge OU_{ge}(x) = 1) \rightarrow Q(x)]$

c. $[\![IP_4]\!]^g = [\![[\varnothing_{every}$ yi-ge$]]\!]^g$ (λX.Cov[X] is a sequence & X $\in$ [*λx.Cov(x) & x is taller than the predecessor of x])
$= \forall$x[(individual(x) $\wedge$ OU_{ge}(x) = 1) $\rightarrow$ Cov[x] is a sequence & x $\in$ [*λx.Cov(x) & x taller than the predecessor o f x]

However, there are two issues with the outcome shown in (50c). Firstly, the variable *x* bound by the universal quantifier is an atomic individual that cannot form a sequence. Secondly, (50c) is a saturated expression that cannot merge further with the plural individual TJDH. Therefore, interpreting "[$\varnothing_{every}$ *yi-ge*]" as a standard generalized quantifier does not seem to work.

Our goal is to ensure that node IP_4 is an expression of type <e,t> so that it can be applied to the plural individual denoted by TJDH to yield a truth value. Beck (2012) has previously analyzed the adverbial *every time* in English universal comparatives, such as *Otto ran faster every time*, as denoting properties of plural events of type <v,t>. It combines with its sister node, which is also of type <e,t>, through conjunction. We propose a similar analysis for "[$\varnothing_{every}$ *yi-ge*]" in Chinese pluractional sequence comparatives. Let "$\varnothing_{every}$" and "[$\varnothing_{every}$ *yi-ge*]" denote (51a) and (51b), respectively, in a way that parallels the denotation of *every time* in (27).

(51) a. $[\![\varnothing_{every}]\!]^g = \lambda P_{<e,t>}.\lambda Cov \lambda X.\forall x \in Cov[X]$: P(x) & $\cup$Cov[X] = X
b. $[\![[\varnothing_{every}$ yi-ge$]]\!]^g = \lambda Cov \lambda X.\forall x \in Cov[X]$: individual(x) & OU_{ge}(x) = 1 & $\cup$Cov[X] = X
"all individual parts of X whose cardinality is 1 are in the cover"
$\approx$ "Cov partitions X into individuals whose cardinality is 1"

With the analysis presented above, the constituent "[$\varnothing_{every}$ *yi-ge*]" in (48) can now combine with its sister node IP_3 through a conjunction via the Predicate Modification rule. As a result, a new denotation of IP_4 is derived as (52) instead of (50).

(52) Final version of the computation of IP_4
$[\![IP_4]\!]^g = [(_{<v,t>} \varnothing_{every}$ yi-ge$_{Cov}) [_{<v,t>}$ (PL^{seq} Cov) [λ_1 [t_1 bi ($\varnothing_{pro1}$ $\varnothing_{last}$ yi-ge) [$_{VP}$ $\varnothing_{er}$ gao]]]]]
$= \lambda X_{<e>}$. Cov[X] is a sequence & $\forall$x $\in$ Cov[X]: individual(x) & OU_{ge}(y) = 1 & $\cup$ Cov[X] = X & X $\in$ [*λx.Cov(x) & x is taller than the immediate predecessor of x]

The denotation of node IP_4, which is an expression of type <e,t>, can then be applied to the plural individual TJDH of type <e> in the outermost position in (48). This results in the desired truth conditions shown in (53).

(53) $[\![CP]\!]^g = [\![IP_3]\!]^g([\![TJDH]\!])$ = Cov[TJDH] is a sequence & $\forall x \in$ Cov[TJDH]: individual(x) & $OU_{ge}(x) = 1$ & $\cup$Cov[TJDH] = TJDH & TJDH $\in$ [*λx.Cov(x) & x is taller than the immediate predecessor of x]

Additional evidence supporting the analysis of "[$\varnothing_{every}$ *yi-ge*]" as an expression of type <e,t> can be found in (54a) and (54b) below. The only difference between these two sentences is that the latter includes the expression *mei yi-ben* "every one-Cl", while the former does not. However, this additional element does not affect the truth conditions, except for placing greater emphasis on each individual book.

(54) a. *Naxie shu wo dou kan-guo*
those book I all read-ASP
'I read all of those books.'
b. *Naxie shu mei yi-ben wo dou kan-guo*
those book every one-CL I all read-ASP
'I read every one of those books.'

Assuming that the phrase *wo dou kan-guo* in (54) denotes a distributive predicate of type <e,t> that requires a plural individual, as shown in (55a) (See Lin 1998), and that the expression *mei yi-ben* is also of type <e,t>, similar to *mei yi-ge* in (51), as shown in (55b), we can combine these two expressions using the Predicate Modification rule, resulting in a new expression of type <e,t> as shown in (55c). Finally, we can apply this expression to the topic/subject phrase *naxie shu* 'those books' to derive the desired truth conditions.

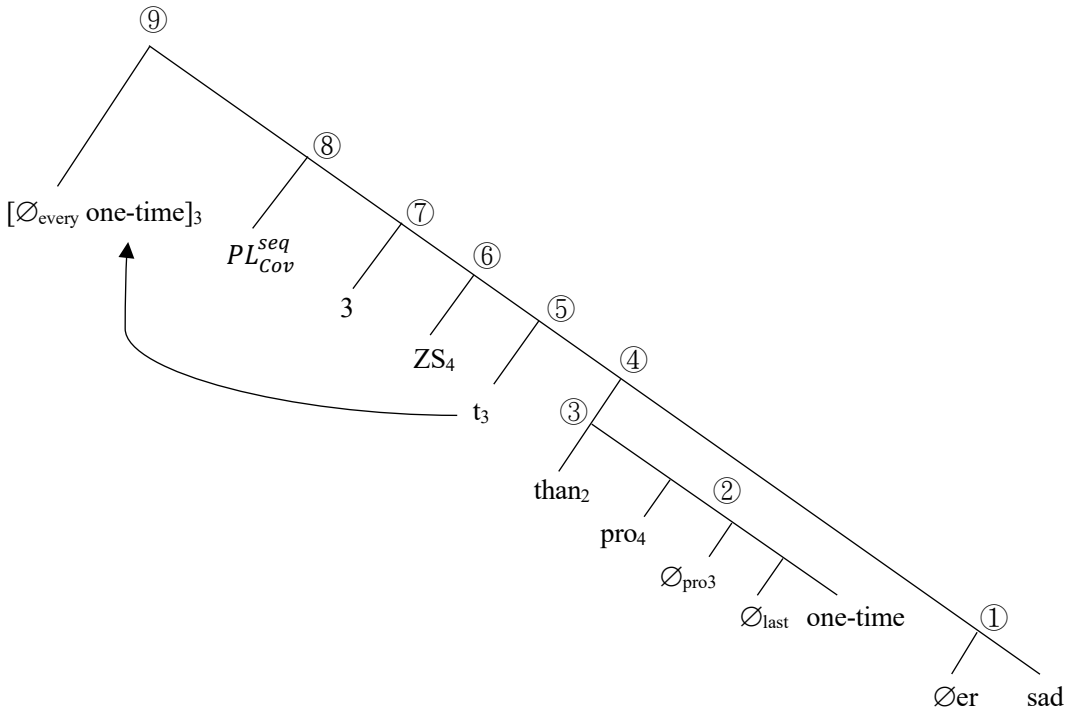
(55) a. $[\![$wo dou kan-guo$]\!]^g = \lambda X.\forall x[x \in Cov[X] \rightarrow$ I read x]
b. $[\![$mei yi-ben$_{Cov}]\!]^g$
$= \lambda X.\forall x \in Cov[X]$: individual(x) & $OU_{ge}(x) = 1$ & $\cup Cov[X] = X$
c. $[\![$mei yi-ben wo dou kan-guo$]\!]^g$
$= \lambda X.\forall x \in Cov[X]$: individual(x) & $OU_{ge}(x) = 1$ & $\cup Cov[X] = X$ & $\forall x[x \in Cov[X] \rightarrow$ I read x]
d. $[\![$na xie shu mei yi-ben wo dou kan-guo$]\!]^g$
$= \forall x \in$ Cov[those books]: individual(x) & $OU_{ge}(x) = 1$ & $\cup$Cov[those books] = those books & $\forall x[x \in$ Cov[those books] $\rightarrow$ I read x]

It is significant to note that the denotation of (55a), being an expression of type <e,t>, can be directly applied to the denotation of the topic noun phrase *naxie shu* 'those book' in (54a). The expression *mei yi-ben* in (54b) serves to further constrain the property denoted by (55a). This is similar to adding an optional adjective of type <e,t>, such as *smart*, to modify the common noun *student* in the noun phrase *a smart student*. This explains why *mei yi-ben* in (54b) is optional.

Our analysis can be applied to other types of classifiers, such as event classifiers, time classifiers, and location classifiers. As an example, let us consider the verbal event classifier *ci* in sentence (2), which we have repeated below as (56). With our proposed approach, we can represent its logical form in English as shown in (57) and its step-by-step computation is given in (58).[13]

(56) *Zhangsan* *yi-ci* *bi* *yi-ci* *shangxin*
Zhangsan one-time than one-time sad
'He is getting sadder and sadder each time.'

(57)



[13] It is easier to understand the logical form (57) when we think of it as the following comparative sentence, where the pronoun is co-indexed with *Zhangsan*.

(i) *Zhangsan* *mei* *yi-ci* *bi* *ta* *shang* *yi-ci* *dou* *gengjia* *shangxin*
Zhangsan every one-time than he last one-time all even.more sad
'He gets sadder and sadder every time.'

(58) a. $[\![\text{sad}]\!]^g = \lambda d \lambda e_v \lambda x_e.x$ is d-sad in event e

b. $[\![①]\!]^g = [\![\varnothing_{er}]\!]^g([\![\text{sad}]\!]^g)$

$= [\lambda P_{<d,<v,<e,t>>>} \lambda e_2 \lambda x_2 \lambda e_1 \lambda y_1[\iota_{max}\ d_1[P(d_1)(e_1)(y_1)] >$
$\iota_{max}\ d_2[P(d_2)(e_2)(x_2)]]](\lambda d \lambda e_v \lambda x_e.x$ is d-sad in event e)

$= \lambda e_2 \lambda x_2 \lambda e_1 \lambda y_1[\iota_{max}\ d_1[y_1$ is d_1-sad in $e_1] > \iota_{max}\ d_2[x_2$ is d_2-sad in $e_2]]$

c. $[\![\varnothing_{pro3}]\!]^g = g(3) = e_3$

d. $[\![②]\!]^g =$ the immediate predecessor event of g(3)

e. $[\![pro_4]\!]^g = g(4) = ZS$

f. $[\![③]\!]^g = <g(4)$, the immediate predecessor event of g(3) >

g. $[\![④]\!]^g = [\![①]\!]^g([\![③]\!])$

$= [\lambda e_2 \lambda x_2 \lambda e_1 \lambda y_1[\iota_{max}\ d_1[y_1$ is d_1-sad in $e_1] > \iota_{max}\ d_2[x_2$ is d_2-sad in $e_2]]$
(<g(4), the immediate predecessor event of g(3)>)

$= \lambda e_1 \lambda y_1[\iota_{max}\ d_1[y_1$ is d_1-sad in $e_1] > \iota_{max}\ d_2[g(4)$ is d_2-sad in the immediate predecessor event of g(3)]]

h. $[\![t_3]\!]^g = g(3) = e_3$

i. $[\![⑤]\!]^g = [\![④]\!]^g(g(3))$

$= \lambda y_1[\iota_{max}\ d_1[y_1$ is d_1-sad in $e_3] > \iota_{max}\ d_2[g(4)$ is d-sad in the immediate predecessor event of $e_3]]$

j. $[\![⑥]\!]^g = [\![⑤]\!]^g(ZS)$

$= [\lambda y_1[\iota_{max}\ d_1[y_1$ is d_1-sad in $e_3] > \iota_{max}\ d_2[ZS$ is d-sad in the immediate predecessor event of $e_3]]]$ (ZS)

$= \iota_{max}\ d_1[ZS$ is d_1-sad in $e_3] > \iota_{max}\ d_2[ZS$ is d-sad in the immediate predecessor event of $e_3]$

k. $[\![⑦]\!]^g = \lambda e_3[\![⑥]\!]^{g(3/e3)} = T$

$= \lambda e_3[\iota_{max}\ d_1[ZS$ is d_1-sad in $e_3] > \iota_{max}\ d_2[ZS$ is d-sad in the immediate predecessor event of $e_3]]$

l. $[\![⑧]\!]^g = [\![PL_{Cov}^{seq}]\!]^g([\![⑦]\!]^g)$

$= \lambda E.Cov[E]$ is a sequence & $E \in [*\lambda e_3[\iota_{max}\ d_1[ZS$ is d_1-sad in $e_3] > \iota_{max}\ d_2[ZS$ is d-sad in the immediate predecessor event of $e_3]]]$

m. $[\![\varnothing_{every}\ \text{one time}_{Cov}]\!]^g = \lambda E.\forall e \in Cov[E]$: times(e) & $OU_{ci}(e) = 1$ & $\cup Cov[E] = E$

n. $[\![⑨]\!]^g = \lambda E.[\![\varnothing_{every}\ \text{one time}_{Cov}]\!]^g(E) = T \wedge [\![⑧]\!]^g(E) = T$

$= \lambda E.\forall e \in Cov[E]$: times(e) & $OU_{ci}(e) = 1$ & $\cup Cov[E] = E$ &
Cov[E] is a sequence & $E \in [*\lambda e_3.\iota_{max}\ d_1[ZS$ is d_1-sad in $e_3] > \iota_{max}\ d_2[ZS$ is d-sad in the immediate predecessor event of $e_3]]$

The resulting expression (58n) can then apply to a plural event E, such as *na ji-ci* 'those several times'. This demonstrates how our approach can successfully explain the meaning of the "*yi*-Cl_1 *bi yi*-Cl_2" construction when the classifier is an event classifier.

Before moving on, we want to address one important issue. Our analysis requires every member in a sequence to have a higher degree than its predecessor with regard to the gradable predicate being compared. However, the first member in the sequence cannot meet this requirement, as it is not preceded by any other member. This issue, known as "the first dog problem", was identified by Beck & von Stechow (2007). To resolve this problem, they suggest using a pragmatic mechanism of domain restriction (C), which is commonly used for quantifiers in natural language. For example, in the sentence "*Every*$_C$ *one has a faster computer than Arnim*", the universal quantifier '*everyone*' must be understood as '*everyone but Arnim*', where '*Arnim*' is excluded from the domain of universal quantification. In this article, we adopt Beck & von Stechow's solution to the first dog problem without delving into further details.

6. Explaining the properties of pluractional sequence comparatives

In the introduction section of this article, we presented five defining properties of PSCs: (a) the requirement of an overt or covert plural entity, (b) the allowance of only *yi* 'one' as the numerical word, (c) the allowance of various classifiers, (d) the reference to adjacent individuals in a sequence, and (e) the expression of multiple successive comparisons with increasing degree of quality. These properties are all derived from our proposed analysis.

A plural XP in either the topic or subject position of a PSC construction is necessary because sequence pluralization generates an expression that predicates on a plural entity.

Classifiers for individuals, places, times, and events can be used in PSCs, as they are all arguments of gradable predicates, and *bi*-comparatives in Mandarin Chinese are used to compare arguments of gradable predicates; Lin (2009; 2022).

The two *yi*-Cl phrases refer to adjacent individuals in a sequence because the silent spatio-temporal determiner specifies an adjacency relation between the denotation of the *yi*-Cl_2 phrase and the determiner's covert pronominal argument that is syntactically and semantically bound by the *yi*-Cl_1 phrase.

Multiple sequence comparisons follow from sequence pluralization, whereby a set of pluralities is involved.

The remaining unexplained property is the requirement to use the numeral word *yi* 'one' in PSCs. To the best of our knowledge, this property has not been analyzed in any previous work. To demonstrate this restriction, we provide three examples where replacing the numeral word in

either the target or standard phrase with a larger number results in an ungrammatical sentence. We argue that this restriction follows from our proposed analysis, specifically from the notion of Cover and sequences.

(59) a. **Naxie haizi liang-ge bi yi-ge gao*
those children two-CL than one-CL tall
'Lit. Every two children are taller than the first one.'

b. **Naxie haizi yi-ge bi liang-ge gao*
those children one-CL than two-CL tall
'Lit. Each child is taller than the other two.'

c. **Naxie haizi liang-ge bi liang-ge gao*
those children two-CL than two-CL tall
'Lit. Every two children are taller than the first two children.'

Assuming the existence of five individuals *a*, *b*, *c*, *d*, and *e* in the discourse, let us examine what the examples in (59) would mean under our proposed analysis for PSCs if they were grammatically valid. For instance, if (59a) were well-formed, it would convey that for every set of three consecutive items, the last two items are greater than the first item. This can be visually represented as:

(60) {b, c} > a
{c, d} > b
{d, e} > c

This representation shows that the members of the Cover would be the set: {a, b, c, {b, c}, {c, d} and {d, e}}. However, this set violates the definition of a Cover, which requires its members not to overlap. Additionally, the five members are not able to form a proper sequence, because *b* and *c* occur on both the right and left sides of the greater-than relation indicated by the arrow. Similar issues are also present in (59b) and (59c). As a consequence, using a numeral word other than *yi* 'one' in a PSC construction is impossible, as it conflicts with the proposed sequence pluralization operator.

We conclude that all the five defining properties of PSCs follow from the proposed analysis of PSCs in terms of silent determiners and sequence pluralization.

7. Conclusion and remaining issues

In this study, we have presented a formal analysis of PSCs in Mandarin Chinese, aimed at uncovering the syntax-semantics interface for these constructions. Our proposal suggests that the interpretation of PSCs involves the interaction between the two silent determiners, "$\varnothing_{every}$" and "$\varnothing_{last}$", and the sequence pluralization operator, "PL^{seq}", which incorporates the notions of Cover and sequence.

Additional evidence supporting our proposed analysis can be found in another construction type that includes two parallel "*yi*-Cl" phrases. This construction takes the form "*yi*-Cl_1 Verb *yi*-Cl_2" and carries comparable universal interpretations and adjacency requirements. Here are a couple of examples to illustrate this point.

(61) a. *Chi zhitongyao ye meiyou xiaoyong, qi tengtong shi yi-ci sheng-guo yi-ci*
eat painkillers also not effect its pain be one-time exceed-ASP one-time
'Taking painkillers has also been of no use. The pain has gotten worse every time.'

b. *Women shou qian shou, yi-ge qian-zhe yi-ge*
we hand in hand one-CL hold-ASP one-CL
'We were hand in hand each one holding the other.'

c. *Tamen zhongzhongdi shuailuo, yi-ge die-zhe yi-ge*
they heavily fall one-CL pile-ASP one-CL
'They fell heavily, with each one piling on top of the last.'

In (61), the first *yi*-Cl phrases have a universal interpretation, and the second *yi*-Cl phrases have an immediate adjacency requirement, parallel to the *yi*-Cl_1 and *yi*-Cl_2 phrases in our PSC construction. It is reasonable to assume that similar silent determiners and pronominal arguments are present in the "*yi*-Cl_1 Verb *yi*-Cl_2" construction.

Our analysis reveals that pluractional comparisons may have diverse forms across languages, but they rely on similar underlying mechanisms and semantic tools. However, our presentation leaves some interesting issues unanswered. One such issue is the licensing of the two silent determiners, "$\varnothing_{every}$" and "$\varnothing_{last}$". Additionally, one might wonder why English does not use parallel phrases of the form "one + N" to convey pluractional comparisons as Chinese does. Thirdly, the non-comparative universal reading of the "*yi*-Cl_1 *bi yi*-Cl_2" construction raises the question of whether it is related to the sequence comparative reading. While these issues

deserve further investigation, we shall briefly touch upon them in the concluding section, without delving into the details due to space limitations.

Regarding the first issue, it is worth noting that Mandarin Chinese employs paired markers to express many semantic relations, including cause-and-effect, coordination, concession, and adversativity (see Xing 2001 for further discussion). The following examples illustrate this phenomenon, with the paired markers underlined.[14]

(62) a. *Yinwei tianqi bu jia, suoyi wo bu qu le*
because weather not good so I not go ASP
'Because the weather is not good, I will not go.'

b. *Suiran ta hen youqian, danshi ta hen didiao*
though he very rich but he very keep.low.profile
'Although he is very rich, he keeps a low profile.'

c. *Ta budan youqian erqie zhang de shuai*
he not.only rich but.also grow DE handsome
'He not only is rich but is also handsome'

d. *Ta yi dao Beijing, jiu dabing-le yi-chang*
he as.soon.as arrive Beijing then fall.ill.seriously-ASP one-CL
'He fell seriously ill as soon as he arrived in Beijing.'

e. *Ta you shengqi you na ta mei banfa*
he CONJ angry CONJ deal.with him no method
'He is both angry and helpless about him.'

We propose that, similar to the paired markers mentioned above, the two silent determiners "$\varnothing_{every}$" and "$\varnothing_{last}$" are licensed in pairs to express pluractional sequence comparisons and co-varying dependence relationship.[15]

The second issue raises the question of why English does not use the same strategy as Chinese to express pluractional sequence comparisons. One possible explanation is that languages have different strategies for conveying meaning, depending on their morphological and syntactic resources. In English, sequential relationships in time or space are expressed using

[14] Not all paired markers appear overtly in every sentence, and sometimes only one of the markers can be deleted without affecting the sentence's meaning. For instance, in sentence (62a), the sentence remains grammatical and conveys the same meaning even if the marker *yinwei* 'because' or *suoyi* 'so' or both are deleted. However, in sentence (62d), the marker *yi* 'as soon as' can be deleted, but the marker *jiu* 'immediately then' cannot.

[15] This idea is inspired by Huang's (2022a: 28–31) analysis of the pattern "*mei* A *dou* B" as resembling to the double markers used in complex sentences in Mandarin Chinese.

a sequential adjective following the definite article. In contrast, in Mandarin Chinese, the sequential word always precedes the numeral-classifier and function as a determiner. For example:

(63) Sequential expressions in English
a. the previous owner of the house
b. the last question
c. the next patient
d. another question = another question

(64) Sequential expressions in Chinese
a. *qian* *yi-wei* *wuzu*
previous one-CL owner.of.the.house
'the previous owner of the house'
b. *shang* *yi-ge* *wenti*
last one-CL question
'the last question'
c. *xia* *yi-wei* *bingren*
next one-CL patient
'the next patient'
d. *ling* *yi-ge* *wenti*
other one-CL question
'Another question'

Please note that the sequential words presented in (64) cannot be used with the definite demonstrative *zhe* 'this' and *na* 'that' in any order, as demonstrated in (65) below.

(65) a. **zhe* *qian* *yi-wei* *wuzu*
this previous one-CL owner.of.the.house
'Lit. the previous owner of the house'
b. **na* *xia* *yi-wei* *bingren*
that next one-CL patient
'Lit. the next patient'

The complementary distribution between sequential words and demonstratives illustrated by (64–65) indicates that sequential words in Chinese function like determiners, whereas in English, they act as adjectives. Based on this observation, we argue that the distinction between pluractional sequence comparatives in English and Chinese can be explained by this difference. Chinese allows for the inclusion of silent determiners such as "$\varnothing_{last}$" since spatio-temporal sequential words function as determiners. However, in English, the use of "$\varnothing_{last}$" is not possible as spatio-temporal sequential words do not occupy the D position.

The third issue concerns the relationship between the comparative and non-comparative readings of the "*yi*-Cl_1 *bi yi*-Cl_2" construction. In comparative sentences, such as *Zhangsan bi Lisi gao* 'Zhangsan is taller than Lisi', the objects being compared do not necessarily have to possess the quality being compared, making them non-evaluative. However, in sentences like *Tamen yi-ge bi yi-ge huai* 'They are worse one than another' in (7a) or Y*uanzi li de shu zhang de yi-ke bi yi-ke gaoda* 'The trees in the yard are taller one than another' in (7b), the construction can be read non-comparatively, implying that all members of the reference set have the property of the gradable predicate.

It is noteworthy that English also exhibits a similar non-comparative universal reading in certain comparative sentences found online. For example:

(66) a. They are here like the beads threaded on a string, one prettier than another.
b. Houses in the neighborhood are decorated with colorful lights, one prettier than another.
c. It was full of only young maidens, one prettier than another, dressed in robes of extraordinary lightness and wearing shimmering crowns on their heads.
d. The square looks really beautiful, with the colorful houses around, one prettier than another.

There is even an example where the word *one* is preceded by *every* as in:

(67) There were three daughters, every one prettier than another.

The fact that the examples in (66–67) can have a non-comparative universal reading is supported by a thread on the AskReddit website. In that thread, a user asked about the grammar of "more pretty," and another user replied with a quote by Alexander Jamieson from 1820:

The worst are those, in which the words, when construed, are not susceptible of any meaning; as, "there were seven ladies in the company, every one prettier than another;" which means, that they were all very pretty. But *one prettier*, implies that there is another *less pretty*. Now where every one *is prettier,* there can be none *less* and consequently none *more* pretty.
(Source: https://www.reddit.com/r/AskReddit/comments/lety7/comment/c2s3kzl/)

The above quote nicely highlights the predicament of non-comparative semantics in comparative sentences. Currently, there is no existing formal explanation for how this non-comparative reading of the construction "(every) one… Adj-er than another" is derived, but from the above quote, one can deduce the following: If none are less pretty and none are prettier, then everyone is equally pretty.

The non-comparative universal reading of the English construction above sheds light on how one should analyze the Chinese "*yi*-Cl_1 *bi yi*-Cl_2" construction to obtain the non-comparative universal reading. Let us assume that, in addition to the silent determiner "$\varnothing_{last}$", which is required for the sequence comparison reading, another silent determiner "$\varnothing_{another}$", similar to the Mandarin word *ling* meaning 'another' in (68), is available for pairing with "$\varnothing_{every}$":

(68) *Wo xihuan ling yi-ge*
I like another one-CL
'I like another one.'

Then the non-comparative universal reading can be derived from the pattern of "[$\varnothing_{every}$ *yi*-Cl]…*bi* [$\varnothing_{another}$ *yi*-Cl]" in the same way that examples (66–67) obtain the non-comparative universal reading. Although the method of deriving the non-comparative universal reading is not yet fully understood, our proposed approach to the Chinese "*yi*-Cl *bi yi*-Cl" construction has an interesting implication. Specifically, the different readings of the "*yi*-Cl *bi yi*-Cl" construction may be due to different pairings between "$\varnothing_{every}$" and "$\varnothing_{last}$" or "$\varnothing_{another}$". The sequence comparison reading selects the pairing "$\varnothing_{every}$…$\varnothing_{last}$", whereas the non-comparative universal reading selects the pairing "$\varnothing_{every}$…$\varnothing_{another}$". If this approach is plausible, then the different readings of the "*yi*-Cl_1 *bi yi*-Cl_2" construction can be ascribed to the content of the silent determiner in "*yi*-Cl_2" phrase. The situation here can be compared to the pairing between *ruguo…jiu* 'if…then' and *ruguo….cai* 'only if…then'. The two pairings lead to different readings.

(69) a. *Ruguo ni bu qu, wo jiu qu*
if you not go I then go
'I will go, if you do not go.'

b. *Ruguo ni bu qu, wo cai qu*
if you not go I only go
'I will go only if you do not go.'

We will leave the above suggestion as a topic for further investigation in the future.

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Abbreviations

ASP aspect
CL classifier
CONJ conjunction
DE a modification marker
EMP emphasis
PAR particle
POSS possessive
PSC pluractional sequence comparatives

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Seeing is (not) believing: On perception verbs in Mandarin Chinese

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This paper examines the syntax and semantics of perception verbs, or PVs, in Chinese. It is proposed that two types of PVs can be distinguished, called complex PVs and bare PVs. The two types of PVs differ from each other in terms of factivity, abilities to express the belief of the speaker or the perceiver, eventualities of the complement, and whether the complement can be headed by an eventive noun. It is found that complex PVs in Chinese require their complement to refer to a perceivable event, and it is argued that complex PVs can be analyzed within the individual event analysis in much the same way as PVs in Japanese and Korean. Complex PVs provide a strong piece of evidence for the individual event analysis because the complement can be headed by an eventive noun (or a situation *pro* when it is phonetically null), and together, they form a gapless relative clause, which denotes the perceived event. Bare PVs, on the other hand, express a doxastic belief of the perceiver and can be analogized to the ECM-construction found in English PV-ECM construction. It is argued that the complement is headed by a functional projection responsible for encoding the perceiver's belief, and the functional head introduces a control relation between the perceived situation and the "believed-to-be" situation. The analysis also sheds light on the controversial issues regarding ECMs and finiteness distinction in Chinese.

Keywords: perception verbs, syntax-semantics interface, Exceptional Case Marking (ECM), finiteness

1. Introduction

Perception verbs (or PVs) refer to verbs/predicates describing human sensory experience, such as 'see', 'hear', and 'feel'. Perception is closely related to how we form our beliefs, as suggested in the proverb "Seeing is believing." If someone says, "I saw it raining outside," we tend to believe that it was raining outside. The relation between perception and belief is not simply a cognitive or psychological issue; languages employ subtle ways of expressing such a relationship, usually by means of syntactic complementation (as we are going to see in the following sections). The linguistic issues have been scrutinized in English since the 1980s, but as far as I know, little attention has been paid to PVs in (Mandarin) Chinese in the areas of formal syntax or semantics. This paper therefore examines PVs in Chinese from a generative perspective. PVs in Chinese will also be compared with those in English and in Japanese and Korean. Empirically, it is observed that there are two types of PVs in Chinese, as shown below:

(1) a. *Wo* *kan-dao/kan-jian* *Lisi* *shi* *xiongshou.*
1SG see Lisi be murderer
'I saw that Lisi was the murderer.'
b. *Wo* *kan/jian* *Lisi* *shi* *xiongshou.*
1SG see Lisi be murderer
'I saw Lisi to be the murderer.'

At first sight, the two types of PVs seem interchangeable, but as we are going to argue, they display distinct syntactic and semantic properties. For example, suppose that you are a criminal investigator, and that you are asking the witness to identify the murderer. If the witness utters (1a), it is certain that the witness has seen the event of murder, in which Lisi killed somebody. On the other hand, if the witness utters (1b), it suggests that the witness has seen evidence leading to the conclusion that Lisi is the murderer (perhaps Lisi looked suspicious and had blood stains on him), but the witness may not have seen the murdering event. Interestingly, we can find a parallel distinction in English, and such a distinction is syntactically represented in embedded complement clauses. A careful crosslinguistic comparison suggests that similar complementation strategies can be identified in Chinese. Specifically, we shall argue that semantically, (1a) falls under the "individual event analysis" (Higginbotham 1983; Saito 2015) and the semantics is translated into syntax as a (nominalized) finite clausal complement, which modifies an event noun (or a phonetically null event *pro*). On the other hand, (1b) can be subsumed under the Exceptional Case Marking (ECM) construction that involves a non-finite clausal complement. The conclusion has deep theoretical implications for Chinese linguistics because both the finiteness distinction and the existence of ECM construction in Chinese have been seriously challenged in the literature (Hu et al. 2001; Paul 2021). We argue that, however, PVs provide evidence for the existence of finiteness (and an ECM-like construction) in Chinese.

The paper is organized as follows. We review earlier findings in English, Japanese, and Korean in §2 regarding the syntax-semantics of different types of complements of PVs. In §3, we lay out the differences between the two types of PVs in Chinese and provide formal analyses of them. Theoretical implications regarding the issues of finiteness will be discussed in §4. §5 concludes the paper.

2. Setting the stage: PVs in English, Japanese, and Korean

2.1 Facts and beliefs

PVs are generally considered (semi-)factive verbs (Kiparsky & Kiparsky 1970; Karttunen 1971; Barwise 1981; Higginbotham 1983; Simons 2007; Moulton 2009). This means that they either presuppose and/or entail the truth of their complements. Consider the standard factive verbs in (2a) and PVs in (2b–c):

(2) a. I am sorry that [you did not pass the exam].
→ You did not pass the exam.
b. John saw [that Mary was at the party last night].
→ Mary was at the party last night.
c. John heard [Mary playing out of tune].
→ Mary was playing out of tune.

In the case of PVs, the embedded clause is typically considered facts because we generally accept our own perception or other people's perception as (in)direct evidence (unless we are to challenge the perceiver). For our purpose here, we shall only consider the cooperative cases where the speaker accepts the perceptual evidence, and we assume that PVs belong to factive predicates.

Syntactically, PVs are also quite unique due to their abilities to take different types of complements. As shown below, PVs in English may employ finite *that*-clauses, small clauses (SC), or non-finite ECM clauses as the complements (Felser 1999; Moulton 2009):[1]

(3) a. John saw [that Mary was driving very fast.] [finite]
b. John saw [Mary driving very fast]. [SC/bare infinitive]
c. %John saw [Mary to be driving very fast]. [non-finite ECM]

One striking difference among the PV-paradigm in (3) has to do with factivity that comes with different complements. As we can see in (4), taken from Moulton (2009: 129), finite clauses and

[1] Not every native speaker of English accepts the ECM complement under PVs (or PV-ECMs). Moulton (2009) reports the judgments without mentioning their marginal status. Felser (1999) states that PV-ECMs are "rarely used in present-day English", but she also points out that they are very different from the SC complement (Felser 1999: 32). Despite the marginal status, it is agreed in the literature that the ECM complement has an "epistemic" or "judgmental" reading, which I shall also assume for the rest of the paper.

small clauses pattern together. PVs are factive in these cases (4a–b). On the other hand, PVs are not factive when they take an ECM complement (4c):

(4) a. Martha saw that Fred was driving too fast, #but he actually wasn't.
b. Martha saw Fred driving too fast, #but he actually wasn't.
c. Martha saw Fred to be driving too fast, but he actually wasn't.

Factivity can be taken as a reflection of the speaker's belief (so if we believe some statement to be true, it is considered a fact). Consider the classic example of Moore's paradox, which shows that you cannot contradict facts and beliefs:

(5) It is raining, #but I do not believe that it is raining.

Therefore, PVs infer the speaker's belief when they have a finite complement clause or an SC complement, but they do not do so when they select an ECM complement. There is another dimension of belief, however, i.e., the perceiver's own belief. Interestingly, an ECM complement (6a) always calls for the perceiver's belief, so the PV is epistemic-positive in Barwise's (1981) term, and this contrasts with the SC complement (6b), which does not require the perceiver's belief (or is epistemic-neutral) (examples from Moulton 2009: 128):

(6) a. Martha saw Fred to be driving too fast, #but she believed he wasn't. [epistemic-positive]
b. Martha saw Fred driving too fast, but she believed he wasn't. [epistemic-neutral]

In summary, PVs are either factive or non-factive and are either epistemic-neutral or epistemic-positive depending on their complements. Concerning such ambiguities, it is typically assumed that PVs are lexically ambiguous between a direct perception reading and an epistemic reading that comes from indirect perception (Higginbotham 1983; Safir 1993), so that PV-ECMs are peculiar because in that case PVs are actually epistemic verbs in disguise, like *found* in *John found Mary to be smart*. However, as argued in Moulton (2009), PVs are systemically ambiguous due to the syntax of their complements, so the factivity and epistemic-positivity are more likely to originate from the complement structures, rather than from the lexical meanings of the PVs *per se*. Furthermore, as Moulton (2009) points out, even when PVs have an epistemic use, they may involve direct perception, as shown in (7), in which it is natural to interpret the sentence as having a mixed perception and epistemic flavor—John has indeed heard of Mary playing and thought that Mary was playing out of tune:

(7) John heard [Mary to be out of tune].

As we shall see in §3, Chinese also provides empirical support for Moulton's syntactic approach because Chinese PVs also display a systemic ambiguity, and the PVs that may involve indirect perception (with an epistemic reading) are drastically different from typical epistemic verbs, such as *believe* and *think*, in terms of their syntactic properties.

2.2 An individual event analysis

Higginbotham (1983) argues that the factivity of PV sentences is attributed to the fact that the complement semantically represents an individual event. The existential closure over the individual event then takes scope over the entire sentence through QR, as in (8b), so eventually, we can derive the entailment from (8a) to (8c):

(8) a. Mary saw John hit a unicorn.
b. [∃*e*: John hit a unicorn]$_{I}$ Mary saw t_{i}.
c. John hit a unicorn.

As an epiphenomenon of perceptual factivity, the object in the complement of the PV *a unicorn* is also referentially transparent (the sentence presupposes that there is a unicorn). The referential transparency is a direct consequence of the individual event analysis, as formalized in (9) (modified from Saito 2015). Since the unicorn is a participant in the perceived event, the factivity of the event then requires its participant to exist in the actual situation, where the event occurs, hence the referential transparency:

(9) a. [∃*e*: *e* is an event [∃*x*: *x* is a unicorn & hit (John, *x*, *e*)]] Mary saw *e*.
b. [∃*e*: *e* is an event [∃*x*: *x* is a unicorn]] John hit *x* in *e*.

(9a) says that there is an event in which there is a unicorn and John hit the unicorn, and Mary saw the event. This presupposes (9b), where there is an event in which there is a unicorn, and the event is such that John hit the unicorn.

The individual event analysis also receives support from the observations in Mittwoch (1990) regarding the asymmetry of event negation:

(10) a. I saw nobody leave.
b. John sees Mary not leave.

(11) a. # I heard the baby not cry.
b. # I felt the wasp not sting me.
c. # I watched Bill not win the race.
d. # I saw the ice not melt.

Example (10) can be paraphrased as 'I saw that everybody stayed' and 'John sees that Mary stays', where the negation of the event can be understood as another event that can be perceived. In (11), on the other hand, the negation of the event leads to non-existence of the event, and since the non-existent event cannot be perceived, the negation leads to infelicity.

While Higginbotham's individual event analysis initially targets only SC complements of English PVs, Saito (2015) shows that the individual event analysis can be extended to finite PV complement clauses in Japanese as well, and Japanese does not employ SCs in PV-complementation. Specifically, Saito shows that different types of finite complements in Japanese can be distinguished through their complementizers, and Japanese has three types of complementizers, *no*, *ka*, and *to*:

(12) a. *Taroo-wa* [$_{CP}$ *Ziroo-ni atta* ***no***]-*o kookaisiteiru*. [factive]
Taroo-TOP Ziroo-DAT met COMP-ACC regret
'Taroo regrets that he met Ziroo.'
b. *Taroo-wa* [$_{CP}$ *Hanako-ga dare-ni atta* ***ka***] [interrogative]
Taroo-TOP Hanako-NOM who-DAT met COMP
tazuneta.
inquired
'Taroo asked who Hanako met.'
c. *Taroo-wa* [$_{CP}$ *Hanako-ga Ziroo-ni atta* ***to***] [speech act]
Taroo-TOP Hanako-NOM Ziroo-DAT met COMP
omotteiru.
think
'Taroo thinks that Hanako met Ziroo.'

Saito argues that CPs headed by *no* (12a) are interpreted as descriptions of events, states, or actions, and it is used under factive predicates. Therefore, in (12a), what Taroo regrets doing is

the event that he met Ziroo. Next, the complementizer *ka* (12b) embeds CPs that are interpreted as questions and can be found only under interrogative verbs. Lastly, CPs headed by *to* (12c) can be regarded as paraphrases of direct discourse (such as assertion and other speech acts), and the complementizer *to* is employed under various speech-act predicates, such as 'say', 'believe', 'hope', 'ask', etc. For our purposes here, we focus on the use of *no* because this very complementizer is also found under PVs in Japanese, as exemplified below:

(13) *Hanako-wa* [$_{CP}$ *kirin-ga* *Ziroo-o* *keru* *no*]-*o* *mita.* [perception]
Hanako-TOP kirin-NOM Ziroo-ACC kick COMP-ACC saw
'Hanako saw that a kirin kicked Ziroo.'

Example (13) indicates that just like the factive predicates, the perception predicate embeds a finite CP that is interpreted as an individual event. Saito's analysis makes sense because it is the event (rather than a speech act) that can be perceived.

Similar patterns are also found in Korean, in which PVs and factive predicates again behave on a par in syntax (from Kim 2009: 346). Both types of constructions employ the *kes*-marker in their complements, which Kim (2009) argues to be an e-type pronoun, identified as the event and world, respectively, in the perception and factive sentences (we shall return to her analysis in §3.2.1):

(14) a. *John-un* [[*totwuk-i* *tomangka-n*]-*un* *kes*]-*ul* [perception]
J.-TOP [[thief-NOM run.away-IPFV]-REL PRON]-ACC
po-ess-ta.
see-PST-DECL
'John saw the event of the thief running away.'

b. *John-un* [[*totwuk-i* *tomangka-n*]-*un* *kes*]-*ul* [factive]
J.-TOP [[thief-NOM run.away-IPFV]-REL PRON]-ACC
al-ess-ta.
know-PST-DECL
'John knew (the fact) that the thief was running away.'

Data from Japanese and Korean therefore provide a substantial support for the individual event analysis of PV-complements.

3. PVs in Chinese

This section deals with PVs in Chinese. We first show that there are two types of PVs in Chinese, and then we show how the two types of PVs can be analyzed in comparison to PVs in English, Japanese, and Korean.

3.1 Complex PVs vs. bare PVs

PVs in Mandarin can have two forms. In terms of their morphosyntactic makeups, we shall call them complex PVs and bare PVs, respectively:[2]

(15) Complex PVs

a. *Zhangsan kan-dao Lisi zai kaiche.*
Zhangsan see-at Lisi PROG drive
'Zhangsan saw Lisi driving.'

b. *Zhangsan ting-dao Lisi zai tan gangqin.*
Zhangsan hear-at Lisi PROG play piano
'Zhangsan heard Lisi playing piano.'

(16) Bare PVs

a. *Zhangsan kan Lisi zai kaiche.*
Zhangsan see Lisi PROG drive
'Zhangsan saw Lisi to be driving.'

b. *Zhangsan ting Lisi zai tan gangqin.*
Zhangsan hear Lisi PROG play piano
'Zhangsan heard Lisi to be playing piano.'

A complex PV consists of a PV and a preposition *dao* 'to/at', while a bare PV is simply the PV itself. As mentioned in (1), bare PVs are generally interpreted as indirect perception (a belief caused by direct perception) and have a flavor of personal judgment. Close examination further reveals that complex PVs and bare PVs are quite different in both syntax and semantics. To foresee the conclusion, the distinction in Chinese parallels the contrasts observed in English, and

[2] A variant of *kan-dao/ting-dao* is *kan-jian/ting-jian*, in which the second verb *jian* (with the literal meaning 'see') has probably lost its visual perception meaning, as it can also be used with *ting* 'hear'. We assume that here it functions like a dummy verb particle that can assign case to the object NP. We shall restrict our attention to *kan-dao*/*ting-dao* in this paper.

complex PVs in Chinese behave like PVs with SCs or finite clauses in English while bare PVs in Chinese behave like PVs with ECM complements. The differences between complex PVs and bare PVs in Chinese are listed in the following subsections.

3.1.1 Factivity

Complex PVs are factive in the sense that they presuppose and/or entail the content of the complement, as in (17a). The sentence means that Zhangsan has witnessed the event in which everyone has left, so contradicting the sentence amounts to saying that Zhangsan was visually impaired (or we wish to challenge the credibility of Zhangsan). On the other hand, bare PVs are not factive, as in (17b). The sentence is salient in a context where Zhangsan saw nobody in the classroom and thought that everyone had left (but in fact nobody left and Zhangsan simply went to the wrong classroom).

(17) a. *Zhangsan kan-dao dajia dou likai-le (??danshi qishi meiyou-ren likai.)*
Zhangsan see-at everyone all leave-SFP but actually nobody leave
'Zhangsan saw everyone leave (#but actually nobody left.)'

b. *Zhangsan kan dajia dou likai-le (danshi qishi meiyou-ren likai).*
Zhagnsan see everyone all leave-SFP but actually nobody leave
'Zhangsan saw everyone to have left (but actually nobody left)'

The factivity is weakened when it involves hearing perception (Kiparsky & Kiparsky 1970; Degen & Tonhauser 2022). Potentially this is because hearing is a less reliable method of obtaining knowledge. Yet again, if we consider the cooperative case (where the perceiver's evidence is credible, and we do not wish to challenge it), then there is a distinction between the complex PV *ting-dao* and the bare PV *ting* as well. If (18a) were acceptable, then we would be challenging the credibility of Zhangsan's perceptual evidence. On the other hand, (18b) simply describes Zhangsan's belief, and his belief may not be the fact:

(18) a. *Zhangsan ting-dao Lisi zai shuo-huang (??danshi Lisi*
Zhangsan hear-at Lisi PROG tell-lie but Lisi
shuo-de shi shishi.)
tell-DE be truth
'Zhangsan heard that Lisi was lying (#but Lisi was telling the truth).'

b. *Zhangsan ting Lisi zai shuo-huang (danshi Lisi*
Zhangsan hear Lisi PROG tell-lie but Lisi
shuo-de shi shishi.)
tell-DE be truth
'Zhangsan heard Lisi to be lying (but Lisi was telling the truth).'

The same effect can be found when the perceiver is the speaker (Yenan Sun, pers. comm.). When a bare PV is used, the sentence usually expresses a sense of uncertainty and indicates that the speaker is not fully committed to the embedded content (the speaker is not sure whether her belief reflects the truth or not), as shown in (19):[3]

(19) a. *Wo ting Lisi shi zai shuo-huang (danshi wo bu-queding.)*
1SG hear Lisi be PROG tell-lie but 1SG NEG-sure
'I heard Lisi to be lying (but I am not sure).'

b. *Wo kan Lisi yijing likai le (danshi wo bu-queding.)*
1SG see Lisi already leave SFP but 1SG NEG-sure
'I saw Lisi to have left (but I am not sure).'

3.1.2 Speaker's belief

One of the ways to express the speaker's belief is through assertion since assertion can be understood dynamically as the speaker's attempt to add her commitment to the Common Ground (Stalnaker 1978, 2002; Farkas & Bruce 2010). It is noted in Simons (2007) that assertion can be embedded under certain verbs that convey evidentiality. Some of the "evidential" verbs, including PVs, are listed in (20B-a) to (20B-e), and non-evidential verbs are shown in (20B-f) to (20B-h) (from Simon 2007: 1036):

[3] A similar expression is *wo-kan-a* 'as I see it'. The expression conveys the speaker's opinion about something and is different from bare PVs discussed here since it is only compatible with the first-person subject (**ni-kan-a* 'as you see it'; **ta-kan-a* 'as he sees it'), and the PV can only be *kan* 'see' (**wo-ting-a* 'as I hear it'). I thank C.-T. James Huang (pers. comm.) for pointing this out to me.

(20) A: Who was Louise with last night?
B: a. She was with Bill.
b. Henry thinks/I think that she was with Bill.
c. Henry believes/I believe that she was with Bill.
d. Henry said that she was with Bill.
e. Henry heard/I heard that she was with Bill.
f. (#) Henry hopes/I hope that she was with Bill.
g. # Henry wishes that she was with Bill.
h. # Henry dreamt that she was with Bill.

The same test can be adopted in Chinese, as shown in (21B-a), and the test allows us to distinguish complex PVs from bare PVs in terms of the speaker's belief. As shown below, complex PVs (which are factive) call for the speaker's commitment to the truth of the complement content, and the embedded clause can be used as the main assertion (21B-b), while bare PVs (which are not factive) do not guarantee the speaker's commitment. A bare PV sentence therefore sounds incomplete, and its complement cannot be used as the main assertion (21B-c):

(21) A: *Lisi zuotian wanshang zuo-le shenme?*
Lisi yesterday night do-PFV what
'What was Lisi doing last night?'
B: a. *Zhangsan xiangxin/shuo/faxian ta zai dushu.*
Zhangsan believe/say/find 3SG PROG study
'Zhangsan believes/said/found that he was studying.'
b. *Zhangsan kan-dao ta zai dushu.*
Zhangsan see-at 3SG PROG study
'Zhangsan saw that he was studying.'
c. *#Zhangsan kan ta zai dushu.*
Zhangsan see 3SG PROG study
'Zhangsan saw him to be studying.'

The contrast also suggests that *kan* cannot be fully identified as epistemic verbs, like *believe* and *find*. The latter can have an evidential use, but the former cannot.

3.1.3 Perceiver's belief

With respect to the perceiver's belief, complex PVs and bare PVs again display quite different behavior. There are cases where the perceiver's belief (though her perception) is different from the fact (see below for example). Complex PV sentences do not report the perceiver's belief of the embedded complement (only factivity is required), but bare PV sentences always do.[4] Let us consider the context in (22). The context involves a disparity between what is perceived to be the case (the house is on fire) and what is actually the case (the house is full of smoke). (22a) is fine with *kan-dao* because what is perceived is the fact. On the other hand, (22b) is considered an overstatement (it is not the most faithful statement because factivity is not obeyed). However, (22c) with a bare PV *kan* is salient in the same context. What Lisi really saw was that the house was full of smoke, but the scene that he perceived led him to believe that the house was on fire. This suggests that bare PVs only require the perceiver's belief (and not factivity):

(22) [Context] *Lisi saw a house with a lot of smoke and thought that it was on fire, but we know that the house was not on fire, but someone cooking in the house unfortunately burned the food—*

a. *Lisi kan-dao fangzi mao-yan, (hai yiwei shi-huo le).*
Lisi see-at house emit-smoke even think on.fire SFP
'Lisi saw the house with a lot of smoke (and thought that it was on fire).'

b. # *Lisi kan-dao fangzi shi-huo le, (ganjin da-gei xiaofang-dui).*
Lisi see-at house on.fire SFP immediately call-to fire.brigade
'Lisi saw the house on fire (and immediately called the fire brigade).'

c. *Lisi kan fangzi shi-huo le, (ganjin da-gei xiaofang-dui).*
Lisi see house on-fire SFP immediately call-to fire-brigade
'Lisi saw the house to be on fire (and immediately called the fire brigade).'

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[4] The Chinese example here is adapted from Barwise's example (Barwise 1981: 374; see also Moulton 2009):

(i) Ralph saw a spy hiding a letter under a rock, but thought she was tying her shoe.

What happened is that the spy was hiding a letter, but what Ralph thought was that she was tying her shoe.

3.1.4 Eventive nouns

Reflecting the semantic selection (perception of an event), complex PVs can have eventive nouns as their objects. By eventive nouns, I mean NPs that describe the process, the sound, or the scene of the event. In Chinese, depending on the analyses, eventive nouns can take a clause as the complement or modifier, resulting in gapless relative clauses on the surface structure (Huang 2016; Lin forthcoming) as in (23). On the other hand, bare PVs cannot take an eventive noun as the sole object (24):[5]

(23) a. *Zhangsan kan-dao Lisi (zai) gongzuo de guocheng/jingxiang*
Zhangsan see-at Lisi PROG work DE process/scene
'Zhangsan saw the process/scene of Lisi working.'
b. *Zhangsan ting-dao Lisi (zai) la xiaotiqin de shengyin.*
Zhangsan hear-at Lisi PROG play violin DE sound
'Zhangsan heard the sound of Lisi's playing a violin.'

(24) a. *Zhangsan kan Lisi zai gongzuo* (**de guocheng/jingxiang*).
Zhangsan see Lisi PROG work DE process/scene
'Zhangsan saw Lisi to be working.'
b. *Zhangsan ting Lisi zai la xiaotiqin* (**de shengyin*).
Zhangsan hear Lisi PROG play violin DE sound
'Zhangsan heard Lisi to be playing violin.'

---

[5] The eventive noun (heading a gapless RC) can function as the subject of the embedded clause, which is not directly selected by the bare-PV. The pattern suggests that bare PVs can only take clauses as their complements:

(i) *Zhangsan ting* [$_{CP/IP}$ [$_{DP}$ [$_{CP}$ *Lisi tan-qin*] *de shengyin*] *hen youmei.*]
Zhangsan hear Lisi play-piano DE sound very beautiful
'Zhangsan heard the sound of Lisi's playing piano to be very beautiful.'

There is also another use of the bare PV *ting*, which means 'to follow'. Such use is not related to perception or belief, and I shall exclude it from the scope of the paper:

(ii) *Ta dou ting Lisi-de.*
3SG all hear Lisi-DE
'He always does what Lisi says.'

3.1.5 Eventuality

As observed above, complex PVs require events as the semantic object (25a), and they cannot take a stative complement (with an individual-level predicate) as the object. If a stative complement is used, it would be coerced to obtain a stage-level interpretation (25b). On the other hand, bare PVs allow both events and states as the complement without any problem (26):

(25) a. *Zhangsan kan-dao Lisi zai kai-che.*
Zhangsan see-at Lisi PROG drive-car
'Zhangsan saw Lisi driving a car.'

b. ??*Zhangsan kan-dao Lisi hen congming.*
Zhangsan see-at Lisi very smart
'Zhangsan saw Lisi very smart.' (better if coerced to 'Zhangsan saw Lisi do a smart move'.)

(26) *Zhangsan kan Lisi* [*zai kai-che*] / [*hen congming*].
Zhangsan see Lisi PROG drive-car very smart
'Zhangsan saw Lisi to be driving a car/very smart.'

3.1.6 Event negation

Complex PVs require an event as the perceived object; therefore, a non-existent event, in the sense of Mittwoch (1990), cannot be a legitimate object of a complex PV. This is confirmed in the following examples:

(27) a. # *Zhangsan ting-dao Lisi mei-you zai tan qin (de shengyin).*
Zhangsan hear-at Lisi NEG-have PROG play piano DE sound
'Zhangsan heard (the sound of) Lisi not playing piano.'

b. # *Zhangsan kan-dao bing mei-you ronghua (de guocheng).*
Zhangsan see-at ice NEG-have melt DE process
'Zhangsan saw (the process of) the ice not melting.'

On the other hand, bare PVs are fully compatible with event negation, and the sentence can be understood as a state where a (scheduled) event does not happen. (28a) means that Zhangsan heard nothing at the time when Lisi was supposed to be playing piano, so Zhangsan thought that

Lisi was not practicing. (28b) means that Zhangsan saw that nothing happened to the ice (when it was supposed to have melted) and believed that the temperature was not high enough to melt the ice:

(28) a. *Zhangsan ting Lisi mei-you zai tan qin.*
Zhangsan hear Lisi NEG-have PROG play piano
'(Lit.) Zhangsan heard Lisi to be not playing piano.'

b. *Zhangsan kan bing mei-you ronghua (suoyi jiu zai jixu jia-re).*
Zhangsan see ice NEG-have melt so then more continue add-heat
'(Lit.) Zhangsan saw the ice to not have melt (so he turned on more heat).'

3.1.7 Modalized statements

Complex PVs are not compatible with modalized complements, but bare PVs are fully compatible with, and even prefer, modalized complements:[6]

(29) a. **Zhangsan kan-dao waimian yinggai zai xiayu.*
Zhangsan see-at outside should PROG rain
'Zhangsan saw that it should be raining outside.'

b. *Zhangsan kan waimian yinggai zai xiayu.*
Zhangsan see outside should PROG rain
'Zhangsan saw it likely to be raining outside.'

3.2 Analyses

We have listed some of the major differences between complex PVs and bare PVs in Chinese. We shall present our analyses in this section. To foresee some of the main proposals, I argue that complex PVs are subject to the Individual Event Analysis and can be subsumed under factive predicates like PVs in Japanese and Korean (Kim 2009; Saito 2015). The complement of a complex PV is headed by a situation pronoun (pro_s) (Kim 2009), which can be realized as an eventive noun. On the other hand, bare PVs are complex predicates that consist of the PV and a covert doxastic attitude predicate (Moulton 2009). Specifically, I shall follow Moulton's analysis

[6] I thank Lawrence Cheung (pers. comm.) for pointing this out to me.

and analyze the bare PV complement as a kind of ECM structure in Chinese, but I shall depart from Moulton's analysis in assuming that ECM structures involve control of the situation PRO, which is responsible for the interpretation of the perceiver's belief of what the situation is like.

3.2.1 Complex PVs

The properties associated with complex PVs (factivity and event-selection) suggest that we can approach the structure with the individual event analysis (Higginbotham 1983; Saito 2015). In English, the individual event analysis is usually assumed for the SC complement of PVs (Basilico 2003). However, as shown in Saito (2015) and Kim (2009), SC is not employed for PV complements in Japanese or Korean. Instead, PVs in Japanese and Korean take nominalized finite clauses as their complements. The nominalization of the embedded CP is evidenced by the fact that the CP is able to receive Case from the PV. This is shown in (13) and (14), repeated below in (30) and (31), respectively:

(30) *Hanako-wa* [$_{CP}$ *kirin-ga* *Ziroo-o* *keru* *no*]-*o* *mita.*
Hanako-TOP kirin-NOM Ziroo-ACC kick COMP-ACC saw
'Hanako saw that a kirin kicked Ziroo.'

(31) *John-un* [[*totwuk-i* *tomangka-n*]-*un* *kes*]-*ul* *po-ess-ta.*
J.-TOP [[thief-NOM run.away-IPFV]-REL PRON]-ACC see-PST-DECL
'John saw the event of the thief running away.'

In this respect, complex PVs in Chinese display properties more like Japanese and Korean PVs in that they are able to take a nominalized CP as the complement, and SC structures are not implemented. In fact, if Paul (2021) is on the right track, Chinese may not employ SC in its syntax at all.[7] In addition to the nominalized CP, I propose that in a verbal complex PV-*dao*, the second element *dao* is a preposition generated under the PV, and it is the preposition *dao* (a prototypical Case assigner) that is responsible for selecting the nominalized CP and assign Case

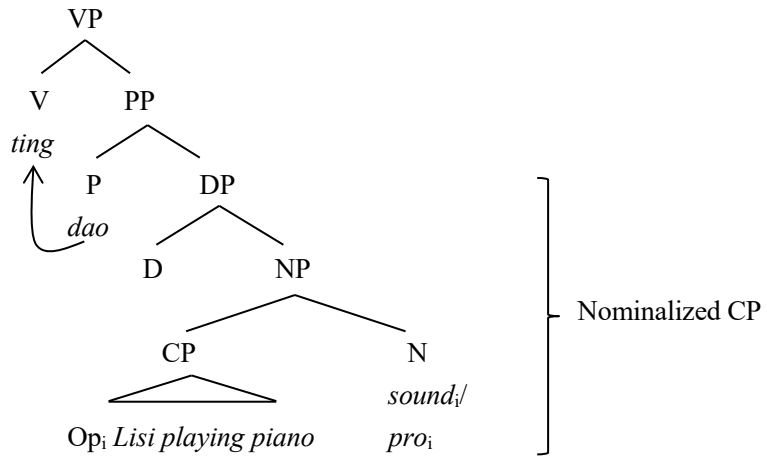
[7] An anonymous reviewer points out that Paul (2021) argues that ECM structures are not employed in Chinese, and the same point has been made in Li (1990) and Ussery et al. (2016). It should be noted, however, that each of these authors' arguments is primarily based on *believe*-type verbs (such as *xiangxin* 'believe', *renwei* 'think', and *dang* 'consider'), and they do not discuss PVs in their study. Therefore, the exact characterization of the generalization should be that ECMs are not employed for *believe*-type predicates (they uniformly take finite complements), a point I also agree with. The generalization cannot be extended to bare PVs, however. Although bare PVs also have a doxastic flavor, they differ from *believe*-type predicates in that complement clauses of bare PVs cannot be used as main assertions, and in this respect, they actually behave more like non-finite complements (see §4.1).

to it (the reason will become clear when we move on to bare PVs). The syntax of complex PVs in Chinese is illustrated below:

(32) Syntax of complex PVs

a. *Zhangsan* [*ting-dao* *Lisi* *tan* *gangqin* *(de* *shengyin)*].
Zhangsan hear-at Lisi play piano DE sound
'Zhangsan heard (the sound of) Lisi playing piano.'

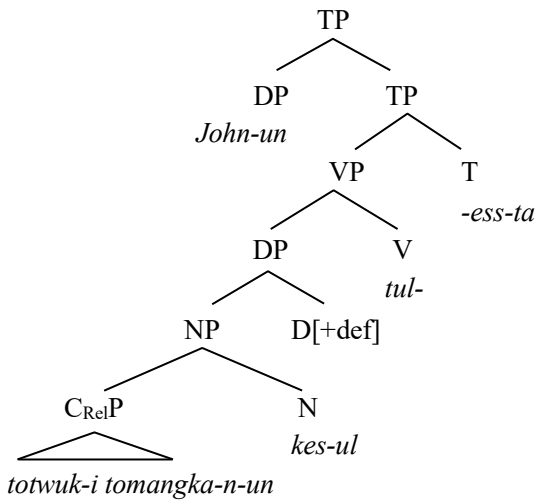
b.



The nominalized CP is a gapless relative clause that is headed by an eventive noun, such as *shengyin* 'sound' or *guocheng* 'process'. I assume that the eventive noun can also be a silent eventive noun, or an eventive *pro*. The complement of a complex PV denotes an individual event, thanks to the eventive noun. The eventive *pro* analysis hinges on the analysis in Kim (2009: 368–369), as illustrated in (33). Kim analyzes the *kes*-marker in Korean perception constructions as an e-type pronoun that represents the perceived event at LF. Due to the limit of space, I shall not go into the details of her analysis, but one can immediately see the crosslinguistic parallelism between (32) and (33), and I take *kes* in Korean as an overt counterpart of the eventive *pro* in Chinese:

(33) a. *John-un* [[*totwuk-i* *tomangka-n*]-*un* *kes*]-*ul* *tul-essta*.
J.-TOP [[thief-NOM run.away-IPFV]-REL PRON]-ACC heard
'The thief was running away and John heard it (= the sound).'

b.



A word must also be said about the internal structure of the nominalized CP with an overt eventive noun. Depending on the analyses of the gapless relative clause in Chinese, the CP is either treated as a complement of the eventive noun (Huang 2016) or it is treated as a modifier of the event argument (Lin forthcoming). The former analysis assumes that the CP is an argument selected by the eventive noun, so that the eventive noun *shengyin* 'sound' would naturally select the event of piano-playing by Lisi. The latter analysis argues that the CP specifies the "content" of the event through Event Identification (Kratzer 1996). For example, in (32b), the eventive noun *shengyin* 'sound' represents a set of event properties ($\lambda e.\ \lambda x.\ x$ is a sound concomitant with event e), and the CP represents a set of events (λe. Lisi is the agent of e and e is a piano-playing event). By event identification, we thus obtain a nominal predicate in NP ($\lambda x.\ x$ is a sound concomitant with e and Lisi is the agent of e and e is a piano-playing event). For our purpose here, either analysis could be adopted here while preserving the gist of the proposal. One restriction that derives from the use of PVs can be observed from the selection of the eventive noun. As a physical property, perception is generally temporally restricted (Felser 1999). We cannot see or hear what has already happened or what is about to happen. Therefore, the eventive noun is sensitive to a simultaneity condition—only those nouns that are concomitant of the CP event can be used in a complex PV sentence. This explains why (34) are infelicitous. (34a) contains a "result" of the event that cannot be heard, and (34b) contains a 'reason' that cannot be naturally seen (unless the "reason" is coerced to an event process, e.g. Zhangsan saw a documentary explaining why Lisi had to build a house):

(34) a. # *Zhangsan ting-dao Lisi tan gangqin de jieguo.*
Zhangsan hear-at Lisi play piano DE result
'Zhangsan heard the result of Lisi playing piano.'
b. # *Zhangsan kan-dao Lisi gai fangzi de yuanyin.*
Zhangsan see-at Lisi build house DE reason
'Zhangsan saw the reason why Lisi built a house.'

The same simultaneity condition explains why complex PVs are not compatible with a complement with an individual-level reading (or a state) or a negated event. The stage-level requirement comes from the fact that the individual event of the embedded CP must be concomitant with the perception event; therefore, it is temporally restricted to the time of perception. A state is not temporally restricted unless it is coerced to a stage-level reading. Such coercion has indeed been observed in (25b). Additionally, a negated event represents an event that cannot be perceived; therefore, it is not compatible with a complex PV.

To sum up, the embedded CP of complex PVs semantically represents an individual event. The event is directly perceived, and this gives rise to factivity and the evidential use of the complex PV. Syntactically, it is a nominalized CP, which can be headed by an overt eventive noun or a null eventive *pro*.

3.2.2 Bare PVs

Let us turn to bare PVs in Chinese. In earlier sections, we have observed that bare PVs have an epistemic or doxastic flavor, and the perceiver forms a personal belief about the content of the complement through (indirect) perception. This can be likened to the behavior of the ECM complement of PVs in English. Let us consider an example like (35a). Moulton (2009: 156) proposes that the doxastic meaning in a PV-ECM construction comes from a functional projection F_{Dox} that is immediately dominated by the PV. The syntax is illustrated in (35b), and (35c) offers the semantics of the F_{Dox} in Moulton (2009). Simply speaking, the doxastic F-head introduces a *de re* belief, so it behaves like an attitude predicate, which universally quantifies over the doxastically accessible worlds, so that the embedded proposition is true in every world compatible with the attitude holder's belief in the actual world (Hintikka 1969). In addition, the doxastic head establishes an acquaintance relation to the *de re* belief (Lewis 1979; 1986), and conveniently, PVs provide such a relation, so (35a) eventually has a meaning like (35d). Here *y* represents the *res* situation (what the belief is about) that is perceived by John (acquainted through the hearing relation R), so that the counterpart of the *res* situation in John's belief is a situation where (the counterpart of) Mary is out of tune:

(35) a. John hears Mary to be out of tune.

b. [John hears [$_{FP}$ F_{Dox} [$_{IP}$ Mary to be out of tune]]].

c. $[[F_{Dox}]] = \lambda p.\lambda R.\lambda s.\lambda w.\exists y_{res}\ [R(y)(s)\ \&\ \text{Acquaint}(R)\ \&\ \forall\ \langle x',w'\rangle\ (\ \langle x',w'\rangle \in \text{DOX}(\iota x.\ \text{Holder}(x)(s)(w),w) \rightarrow \text{p}(\iota y'.\ \text{R}(y')(s)(w'))(w'))]$

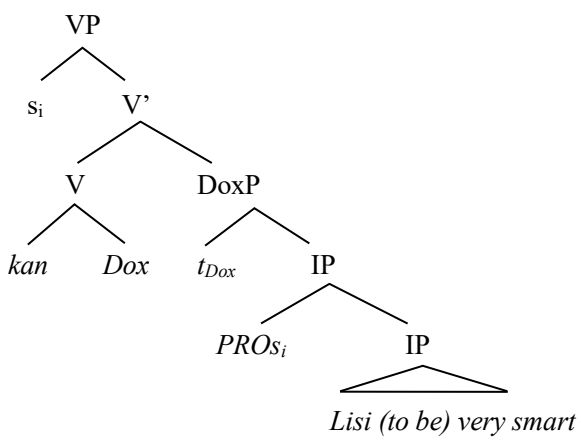
d. John bears an acquaintance relation of hearing to some *res y* in the actual world and believes of *y* that it is a state of Mary out of tune.

I adopt a version of Moulton's analysis of the PV-ECM in English to account for bare PVs in Chinese. I propose that bare PVs in Chinese also take a doxastic FP (called DoxP) as its complement, which competes with the preposition *dao* in the complex PV, and the Dox head also incorporates into the verb, forming a complex predicate to be saturated by the *s* (situation) argument and the perceiver. Regarding the semantics of the Dox head, I shall depart from Moulton in assuming that the DoxP introduces a control relation between the perceived situation (the *s* argument in the Spec of VP) and the embedded situation (the situation believed to be the case). The syntax of bare PVs in Chinese is illustrated below:[8]

(36) Syntax of bare PVs

a. *Zhangsan* [*kan* *Lisi* *hen-congming*].
Zhangsan see Lisi very-smart
'Zhangsan sees Lisi to be very smart.'

b.



[8] An anonymous reviewer asks how the embedded subject Lisi receives its Case. I assume that Lisi here receives its accusative Case from the matrix V (much like the ECM-object in English). The Case valuation is possible since there is no ϕ-complete CP in the embedded clause, and therefore, the embedded IP will not be transferred either due to the lack of C or due to the defectiveness of C (so that the embedded clause does not constitute a phase), and the embedded subject is able to obtain its Case from the matrix V (see Boskovic 2007 and Saito 2017 for discussion). More study is needed to substantiate the ECM analysis of bare PVs in syntax, however, and I leave it for future study.

The control relation plays a crucial role in deriving an indirect perception in bare PV constructions because in an indirect perception, the two situations do not have to be identical, but the perceived situation can be a subset of the embedded situation. This is reminiscent of the partial control phenomenon (Landau 2000, 2015; Pearson 2016). The original framework of Pearson (2016) discusses the partial control relation among individual arguments and temporal arguments. For example, in a partial control sentence, such as the following, the t_2 in the controlled clause is a future extension of the matrix t_1 (so that t_1 is part of t_2), and by the same token, the controlled PRO is a superset extension of the controller *John* (so that *John* is part of PRO):

(37) John_i hoped (at t_1) [PRO_{i+} to go to the movies together (at t_2)].

We shall generalize Pearson's analysis to further include the situation/event argument so that we can talk about extensions of situations/events (e.g. when an event is part of another event/situation). Adopting the semantics of obligatory control (OC) in Pearson (2016), the denotation of the Dox functional head can thus be adjusted as below (assume that v is the type of situation/event variables s and w is the type of world variables w):

(38) $[[\text{Dox}]] = \lambda Q_{<e <v <w, t>>>}. \lambda P_{<v <w, t>>}. \lambda x_e.\lambda s_v.\lambda w_w.[Q(x)(s)(w)\ \&\ \forall <x', w', s'> \in \text{Dox}_{<x, w, s>}. P(s')(w')]$, where $\text{Dox}_{<x, w, s>} = \{w'$: it is compatible with x's belief through $Q(x)(s)$ in w, and $<x', s'>$ in w' are (extensions of) the counterparts of $<x, s>$ in $w.\}$

The semantics says that the functional head Dox takes a property of situation P (of the type <v, <w, t>>), a perceiver and attitude holder x, a situation s, and a mode of perception Q (of the type <e, <v, <w, t>>>), and it quantifies over the property of situation and returns a truth value. In the example of (22c), repeated below as (39a), P is 'λs. the house is on fire in s', x is Lisi, the perceived situation is a covert situation (the house is full of smoke), and the perception mode Q is the PV (whose denotation is [$\lambda x.\lambda s.\lambda w.$ x sees s in w]). Applying the semantics of Dox, we thus obtain the meaning (informally represented) in (39b), in which the perceived event (i.e., the house is full of smoke) is a sub-event of the believe-to-be event (i.e., the house is on fire, which contains sub-events like 'there is smoke', 'there is fire', 'there is burning sound', 'firemen came', etc.):

(39) [Context] *Lisi saw a house with a lot of smoke and thought that it was on fire, but we know that the house was not on fire, but someone cooking in the house unfortunately burned the food—*

a. *Lisi kan fangzi shi-huo le…*
Lisi see house on-fire SFP
'Lisi saw the house to be on fire…'

b. Lisi saw *s* in *w* (the house is full of smoke) and believes that *s*' (which is an extension of the counterpart of *s*) is a situation where the house is on fire in *w*'.

I assume that the same mechanism can derive other cases of indirect perception, e.g. when a bare PV takes an individual-level complement, such as in (26)/(36) *Zhangsan kan Lisi hen congming* 'Zhangsan saw Lisi to be very smart'. In this case, what was perceived by Zhangsan might be a smart move that Lisi made, and Zhangsan thus believes Lisi to be very smart. In this case, the perceived situation is an episodic event that is a subset of the non-episodic state of Lisi being smart (Kratzer 1989). We therefore derive the indirect perception use of bare PVs through the semantics of partial control of the situation argument.

Dox is a particular type of belief-attitude predicate, which requires the mode of perception be specified, i.e., the *Q* argument in (38). Essentially, specifying the mode of perception has the same effect as the acquaintance relation in Moulton's (2009) analysis, which relates the perceived situation to its counterpart situation in the alternative world(s) through some mode of perception. Due to the Dox, bare PVs always involve the perceiver's belief (a belief through perception). The incompatibility of a bare PV with an eventive noun is therefore predicted by the semantics of Dox. The Dox head encodes a belief, so that the embedded complement is a proposition, rather than an individual event. This also accounts for why bare PVs allow for the event negation (28) (although the existence of event is negated, the complement still has a propositional meaning) and why bare PVs are compatible with modalized statements (29) (because modals are propositional quantifiers, and they do not quantify over events). In addition, the ability to select either an individual-level or a stage-level complement follows from the semantics of partial control, as shown in (39).

4. Theoretical implication for finiteness

The finiteness distinction plays an essential role in the proposed analyses of PVs in Chinese. Complex PVs have a nominalized finite complement clause (like PVs in Japanese and Korean), and bare PVs a non-finite complement clause (like PV-ECMs in English). This section discusses the finiteness distinction under the formalization of Bianchi (2003) and Liao & Wang (2022).

4.1 Finiteness as logophoric anchoring

It has been shown that complex PVs bring about speaker's belief (so that the embedded clause can function as the main assertion), while bare PVs do not give rise to factivity or speaker's belief. In this respect, complex PVs and bare PVs behave like finite and non-finite complements in Chinese, respectively. It is generally assumed that finite clauses are found under *believe*-type predicates and non-finite clauses under *persuade*-type predicates. (Li 1990; N. Huang 2018; Huang 2022). Observe the contrast between (40) and (41):

(40) A: *Lisi zuotian wanshangzuo-le shenme?*
Lisi yesterday night do-PFV what
'What was Lisi doing last night?'
B1: *Zhangsan xiangxin/shuo/faxian ta zai dushu.* [*believe*-type: finite]
Zhangsan believe/say/find 3SG PROG study
'Zhangsan believes/said/found that he was studying.'
B2: *Zhangsan kan-dao ta zai dushu.* [complex PVs: finite]
Zhangsan see-at 3SG PROG study
'Zhangsan saw that he was studying.'

(41) A: *Zhangsan zuotian zuo-le shenme?*
Zhangsan yesterday do-PFV what
'What did Zhangsan do yesterday?'
B1: # *Lisi quan/yao Zhangsan*$_i$ *PRO*$_i$ [*persuade*-type: non-finite]
Lisi persuade/ask Zhangsan
tan gangqin.
play piano
'Lisi persuaded/asked Zhangsan to play piano.'
B2: # *Lisi kan/ting Zhangsan zai tan gangqin.* [bare PVs: non-finite]
Lisi see/hear Zhangsan PROG play piano
'Lisi saw/hear Zhangsan to be playing piano.'

The question is how we can capture the parallelism between finiteness and the two types of PVs. A solution can be found within the formalization of finiteness in terms of logophoric anchoring (Bianchi 2003):

(42) a. Finite clauses can anchor to the external Logophoric Center (eLC).
b. Nonfinite clauses must and can only anchor to the internal Logophoric Center (iLC).

Bianchi (2003) argues that a logophoric center (LC) consists of the participants (speaker & addressee) and a set of temporal/locational coordinates. LC can be further distinguished between external and internal ones. The eLC refers to the absolute speaker and the utterance time, and the iLC refers to the attitude holder and the matrix time. To illustrate, consider the following examples in English:

(43) a. John said [that Mary is pregnant].
(Mary is pregnant at the time of John's saying as well as at the speech time)
b. John believed [Mary to be pregnant].
(Mary is pregnant at the time of John's belief)

The finite complement clause in (43a) has a double-access reading, in which Mary is pregnant at the time of the John's utterance as well as at the speech time of the external speaker (the external LC), while the non-finite (43b) cannot give rise to the double-access reading, and Mary's pregnancy only holds at the time of John's belief (the internal LC). Extending Bianchi's theory, Liao & Wang (2022) argue that finiteness in Chinese can be defined by world-anchoring (whether the embedded proposition is evaluated in the external world or internal worlds), and only finite clauses allow the embedded proposition to be evaluated in the external world (actual world), and non-finite clauses can only be evaluated in the attitude holder's alternative worlds. If the proposal is on the right track, then it provides an account for why complex PVs can be used to convey the speaker's belief of the complement clause (hence it can be used as the main assertion), while bare PVs only ascribe the perceiver's own belief. The complement of a bare PV is a non-finite clause, so the proposition can only be evaluated in the doxastic alternative worlds accessible to the perceiver's world, but the proposition is not evaluated in the external speaker's (actual) world.[9]

[9] An anonymous reviewer raises a question regarding the small clause in English, which is non-finite, but does give rise to referential transparency. Following Basilico (2003), I assume that the referential transparency of small clauses in English is due to its topic projection, which holds a covert situation topic that represents an event argument. Therefore, it may give rise to referential transparency regardless of the finiteness of the clause.

4.2 Problem of sentence-final particle *le*

Potential counterevidence comes from the sentence-final particle (SFP) *le*, which has been claimed to be a diagnostic tool for the finiteness distinction in Chinese in Zhang (2019) and Huang (2022) (but see Grano 2017 for a different view). Indeed, when we look at the complement clauses of the *believe*-type verbs and those of the *persuade*-type verbs, *le* is only compatible with the former (finite clauses):[10]

(44) a. *Zhangsan xiangxin* [*Lisi (yijing) likai zheli le*].
Zhangsan believe Lisi already leave here SFP
'Zhangsan believes that Lisi has (already) left.'
b. **Zhangsan quan* [*Lisi (yijing) likai zheli le*].
Zhangsan persuade Lisi already leave here SFP
(Intended) 'Zhangsan persuaded Lisi to have (already) left here.'

However, the non-finite complement of a bare PV is fully compatible with the SFP *le*, which may suggest that the non-finite complement analysis is not on the right track:

(45) a. *Ta kan* [*Lisi yijing chi-bao le*].
3SG see Lisi already eat-full SFP
'He saw Lisi to have been full (from eating).'
b. *Ta ting* [*Lisi yijing chang-wan-ge le*].
3SG hear Lisi already sing-finish-song SFP
'He heard Lisi to have finished singing.'

However, there is reason to think that (44b) is ruled out by independent reasons not related to the finiteness distinction. Wurmbrand (2014) has noticed that verbs of the *persuade*-type, including *persuade, plan, hope, decide, expect*, etc., belong to the category of "future irrealis" verbs. These verbs are semantically encoded with a (irrealis) future-oriented meaning (the situation has not been realized). The sentence-final particle *le*, however, has a perfect aspect function, which refers

[10] Example (44b) is acceptable when *le* is associated with the matrix verb *quan* 'persuade' with the interpretation in (i), where *yijing* 'already' modifies the matrix verb:

(i) *Zhangsan* [*yijing quan* [*Lisi likai zheli*] *le*].
Zhangsan already persuade Lisi leave here SFP
'Zhangsan has already persuaded Lisi to leave here.'

to a change-of-state after the realization (or completion) of the situation. This suggests that the situation has been realized (or completed). A clear example showing the perfect aspect function of the sentence-final *le* is in (46), where the durative phrase occurring with the sentence-final *le* measures the time from the completion of the event to the speech time (Li 1987):

(46) *Zhangsan xie-wan zuoye san-ge xiaoshi le.*
Zhangsan write-finish homework three-CLF hour SFP
'It has been three hours since Zhangsan finished his homework.'

Therefore, verbs of the *persuade*-type are not compatible with the SFP *le* because it is not possible to refer to the initiation (or completion) of an unrealized situation in the future (see also Hu et al. 2001). On the other hand, given their doxastic meanings, bare PVs can be likened to *believe*-ECM verbs in English. They select a complement with a non-episodic imperfective (stative or progressive) interpretation. Since the SFP *le* may refer to the state after the completion of the situation, the SFP *le* is fully compatible with bare PVs. (45a), for example, refers to the state of Lisi being full after the eating event. In fact, the analogy between Chinese bare PVs to English *believe*-ECM verbs can be strengthened by the fact that bare PVs in Chinese do not license a bare verb in the complement clause with a perfective interpretation, just like the *believe*-ECM constructions in English; furthermore, they both license a stative complement.[11] The similar patterns are illustrated in (47) and (48):

(47) a. John believed Mary to [be singing/have sung/*sing] a song.
b. John believed [Mary to be smart].

(48) a. *Zhangsan kan Lisi [zai xie zuoye / xie-wan zuoye le/ *xie zuoye].*
Zhangsan see Lisi PROG write homework write-PFV h.w. SFP write homework
'Zhangsan saw Lisi to [be writing/have finished writing/*write] his assignment.'
b. *Zhangsan kan [Lisi hen congming].*
Zhangsan see Lisi very smart
'Zhangsan saw Lisi to be smart.'

[11] I thank I-ta Chris Hsieh (pers. comm.) for pointing this out to me.

5. Concluding remarks

I have argued that the distinction between complex PVs and bare PVs in Chinese be analyzed through the finiteness distinction. Specifically, complex PVs take a complement that is a nominalized finite clause headed by an eventive noun or a phonetically null eventive *pro*, whereas bare PVs take a non-finite complement that is analogous to the PV-ECM construction in English. The analysis helps explain why complex PVs select a complement that has the properties of an individual event, and why bare PVs have an indirect perception use and are equipped with a doxastic meaning. The finiteness distinction between the two types of PVs supports the claim made in Li (1990), N. Huang (2018), and Huang (2022) that Chinese displays the finiteness distinction despite the lack of grammatical tense. The observations based on factivity and speaker's/perceiver's belief further strengthen the proposals in Bianchi (2003) and Liao & Wang (2022), in which the finiteness distinction is defined over logophoric anchoring, so that the complement of a bare PV, being non-finite, can only express the belief of the perceiver, but not that of the speaker. If the analysis is on the right track, it provides crosslinguistic support for the view that universally the various interpretations of PV sentences do not arise from the semantics of PVs *per se*, but they come from elements in the complement of PVs. In Chinese, the distinction can be made by the element incorporated into the PVs. Complex PVs are incorporated with a preposition *dao*, and bare PVs with a functional Dox head. I have, however, only scratched the surface of the issue in this paper. There are other ways of forming complex PVs, such as *ting-shuo* 'hear-say' and *kan-zhe* 'see-PROG', which may also be crucial for further unraveling the complicated properties related to PVs. I hope this paper can call more attention to the internal syntax and semantics of PV sentences, and I shall leave these issues for further investigation.

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Abbreviations

1	first person
3	third person
ACC	accusative
CLF	classifier
COMP	complementizer
DAT	dative
DECL	declarative
DOX	doxastic
ECM	exceptional case marking
IPFV	imperfective
NEG	negation
NOM	nominative
OC	obligatory control
PFV	perfective
PROG	progressive
PRON	pronominal
PST	past
PV	perception verb
SC	small clause
SFP	sentence-final particle
TOP	topic

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泰雅語書寫符號中的音韻規律探秘

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本文闡述泰雅語書寫符號與語音之間的對應關係，側重於目前書寫方式不一致之處，進而探討這些議題背後所牽涉到的音韻規律，包括元音的弱化及刪除、詞幹尾音段轉換所蘊含的滑音強化與擦音弱化、喉塞音的省略與弱化、以及含中綴 <in> 的發音，希望對於討論書寫原則、以及對於想要透過書面資料了解泰雅語語音概廓的讀者有所助益。

關鍵詞：央中元音、喉塞音、滑音強化、滑音擦音化、元音刪除、輔音增生

1. 引言

台灣原住民語言的書寫文字，近幾十年來在保存族語、提升族語的語言活力等方面，扮演重要的角色。自 1992 年教育部版羅馬字（李壬癸 1992）、至 2005 年 12 月原住民族委員會（原民會）與教育部共同頒布原住民族語言書寫符號這期間，文字系統漸趨穩定（李台元 2013: 36–46），但是個別詞彙的書寫方式仍常有出入。這些不一致之處，有時導因於方言或個人語音差異，有時則和語言系統內部的語音、音韻規律、或構詞結構有關。羅馬拼音文字系統是便捷的表音文字，直接反映了語音特徵，但是書寫文字該反映多少發音上的細節，常會因為有不同的考量而造成紛歧。

本文聚焦於泰雅語，闡述現今常見的泰雅語書寫方式差異所牽涉到的音韻規律。書寫方式不一致之處，有些直接來自於發音差異，例如詞尾喉塞音的有無。有些則是因為各方言的音韻差異使得相同的書寫規範在不同方言的適用性不同，例如「書寫時省略弱元音」這個原則，對於弱元音只出現在開音節的方言相當簡潔，但是對於弱元音可出現在開音節及閉音節的方言，若是省略所有的弱元音便無法由書寫符號輔音串「還原」發音時該有的弱元音。本文將以賽考利克泰雅語的語言材料為主，呈現方言間的音韻差異與書寫時省略弱元音之間的關係。

書寫符號輔音串的議題與元音弱化及元音刪除規律有關。其他與書寫議題相關的音韻規律還包括了滑音與擦音的轉換、喉塞音及其他詞尾音段的弱化或刪略、出現在中綴

<in> 形式的輔音增生、帶音位性的滑音與衍生滑音的區別、以及衍生的中元音。本文的第二節將先對泰雅語的書寫符號及方言間的語音音韻差異作一基本的介紹。第三節討論省略弱元音的連帶影響，例如相同的輔音串在不同的次方言對應至不同的唸法、輔音後接滑音時（Cy/Cw）至少有兩種可能發音、以及需要區分輔音串及雙字母組合 ng 和 zy 等議題。第四節討論詞幹尾音段的轉換，包括滑音強化為擦音、以及詞尾擦音弱化為滑音等。第五節探討與喉塞音相關的議題。第六節闡述因為中綴 <in> 而產生的輔音增生現象。第七節總結本文的重點與貢獻。

2. 泰雅語的書寫符號及方言間主要的語音音韻差異

原民會與教育部於 2005 年頒布的原住民族語言書寫符號，使用羅馬拼音，泰雅語部分分為賽考利克、四季、澤敖利、汶水、萬大等五個語別。後續的族語認證考試做了較為精細的分類，增加了宜蘭澤敖利。在「110 年度原住民族語言書寫系統修訂共識成果報告書」中，六個泰雅語語別共有 20 個輔音（或稱為子音）及五個元音（或稱為母音）符號 i、e、a、o、u。在下表中，泰雅語「舌根音」的發音部位其實是舌頭後部（back of tongue）趨近軟顎，而非真正在舌根（tongue root）位置；此處按共識成果報告書中的用詞，以舌根音稱呼之。

（1） 泰雅語六個語別的書寫符號及其對應的國際音標[1]

1：賽考利克泰雅語　2：四季泰雅語　3：澤敖利泰雅語
4：汶水泰雅語　5：萬大泰雅語　6：宜蘭澤敖利泰雅語

發音部位	發音方式	清/濁	書寫文字	1	2	3	4	5	6	國際音標
雙唇	塞音	清	p	✓	✓	✓	✓	✓	✓	[p]
舌尖	塞音	清	t	✓	✓	✓	✓	✓	✓	[t]
舌根（軟顎）	塞音	清	k	✓	✓	✓	✓	✓	✓	[k]
小舌	塞音	清	q	✓	✓	—	✓	—	—	[q]
喉	塞音	清	’	✓	✓	✓	✓	✓	✓	[ʔ]
舌尖 舌面	塞擦音 塞擦音	清 清	c	✓	✓	✓[2]	✓	✓	✓	[ʦ] [ʨ]

[1] 在本文裡，國際音標一律置於方括號 [ ] 中，表示實際的發音；或出現於雙斜線 / / 之中，表示經過音韻分析之後底層的音位（或稱音素）。「語別」一詞為共識成果報告書之用詞，大致相當於語言學文獻裡的「方言」。

[2] 澤敖利泰雅語裡，c 的發音為舌尖塞擦音的詞彙，在族語 E 樂園學習詞表中均為外來語，例如 kung_sincay「空心菜」。

續上表

雙唇	擦音	濁	b	✓	✓	✓	✓	✓	✓	[β]
舌尖 舌面	擦音 擦音	清 清	s	✓	✓	✓	✓	✓	✓	[s] [ɕ]
舌尖 舌面	擦音 擦音	濁 濁	z	✓	—	✓	—	—	—	[z] [ʑ]
舌根（軟顎）	擦音	清	x	✓	✓	✓	✓	✓	✓	[x]
舌根（軟顎）	擦音	濁	g	✓	✓	✓	✓	✓	✓	[ɣ]
咽	擦音	清	h	✓	✓	✓	✓	✓	✓	[ħ]
雙唇	鼻音		m	✓	✓	✓	✓	✓	✓	[m]
舌尖	鼻音		n	✓	✓	✓	✓	✓	✓	[n]
舌根（軟顎）	鼻音		ng	✓	✓	✓	✓	✓	✓	[ŋ]
舌尖	顫音		r	✓	✓	✓	✓	✓	✓	[r]
舌尖	拍音		r̲	—	—	—	—	✓	—	[ɾ]
舌尖	邊音		l	✓	✓	✓	✓	✓	✓	[l]
雙唇舌根	滑音		w	✓	✓	✓	✓	✓	✓	[w]
舌面	滑音		y	✓	✓	✓	✓	✓	✓	[j]

輔音書寫符號當中的 ’、c、b、g、h、ng、r̲、y，與其國際音標的型態不同。[3] 書寫時以 ’ 表示喉塞音 [ʔ]、c 表示塞擦音 [ʦ/ʨ]、ng 為舌根鼻音 [ŋ]、y 為舌面滑音 [j]，在台灣南島語言相當常見。符號 b 和 g 對應至國際音標的雙唇濁擦音 [β] 及舌根濁擦音 [ɣ]；採用 b、g 一方面便於打字排版，另一方面也反映了 [β、ɣ] 的發音是由原始泛泰雅語（Proto-Atayalic）的 *b 及 *g 發展而來（Li 1981: 251, 255）。較為年輕的泰雅語語者在發音時常會以唇齒擦音 [v] 取代雙唇擦音 [β]；書寫時以單一符號 b 來表示這些不同的變體較為適切，因為 [β] 與 [v] 無區辨意義的功能、且發音方式接近。泰雅語的 h 帶有明顯的咽喉化，較為接近國際音標的 [ħ] 而非 [h]。另外值得一提的是，舌尖顫音 r [r] 及舌尖拍音 r̲ [ɾ] 的對比，只出現在萬大泰雅語，承襲自原始泰雅語 （Proto-Atayal; Goderich 2020: 92）；其他方言只有一個音位 /r/，實際發音可以是顫音 [r] 或閃音 [ɾ] 兩種不同的同位音（allophone）。

這些輔音書寫符號大多數對應至泰雅語的音位（phoneme），但是 /w j/ 及 /z/、/ʦ/ 的音位地位稍有爭議。以下分別討論滑音 /j w/、擦音 /z/、及塞擦音 /ʦ/，再綜合呈現方言間的差異。

[3] 在（1）當中以較深的灰底表示這些音。若是考慮 s 與 z 顎化的變體 [ɕ ʑ]，則 s 與 [ɕ]、z 與 [ʑ] 的型態也不同。在 2.3 小節將進一步討論泰雅語的顎化規律。

2.1 帶音位性的滑音

關於滑音 w、y，丹麥學者 Egerod 在其一系列（1965; 1966; 1980）的著作將它們視為元音性質，例如「中午」記為 qlian 而非 qlyan、「果實」記為 buai 而非 bway，這個分析裡並沒有音位性滑音（phonemic glide）。在 Egerod（1999）修訂版的泰雅語–英語辭典中，部分高元音改為滑音符號，包括在詞首位置、例如 iulaq 改為 yulaq「樹皮」，在兩元音中間、以及當詞尾的高元音與前面的元音不同時，例如 gmuiau「涉水過河」改為 gmuyaw。[4] 然而其他元音串裡的高元音維持不變，例如 smiax「照亮」、mqianux「生活」、kgii「苧麻」、suruu「後面」。Li（1980）根據泰雅語語音的分布及轉換等證據，認為應該採用滑音，因此上述例詞分別為 qlyan、bway、yulaq、gmuyaw、smyax、mqyanux、kgiy、suruw。

H. Huang（2014）聚焦於元音前滑音（prevocalic glide），比較構詞音韻相關形式及不同的音節劃分形態，指出泰雅語元音前的滑音其實分為兩類：有些在底層是帶音位性的滑音（phonemic glide；例如 mqyanux [məqjanux]），有些則是由底層元音衍生而來的元音性滑音（vocalic glide；例如 smyax [sɥmjax]）。關於元音後的滑音（postvocalic glide），H. Huang（2015b: 66）對比了不同方言，說明賽考利克泰雅語非詞尾位置的元音後滑音，在歷史發展上是由元音變來的。例如，新竹縣五峰鄉桃山村賽考利克泰雅語的三音節詞 mgnaw’ [mə.ɣə.nawʔ]，對應至較為存古的苗栗縣泰安鄉錦水村汶水泰雅語的四音節詞 maganawu’ [ma.ɣa.na.wuʔ]（或 maganau’ [ma.ɣa.na.uʔ]）「玩」，這是因為桃山泰雅語縮減元音的時長，mgnaw’ 當中的 naw’ 其實含兩個元音，但是唸為單音節 [nawʔ]。[5]

這些滑音的音韻本質從語言學分析的角度來看略顯複雜，需要透過構詞相關形式來區分在音韻底層為滑音或元音。現今大部分的泰雅語書面語料將音位性滑音及元音衍生而來的滑音一律寫為滑音符號 y、w，因此音韻本質的不同並沒有造成書寫方式的歧異。以泰雅語的情況而言，雖然書寫方式未反映音韻本質，反而更為便捷。元音符號僅用於實際發為元音的音，由一個詞裡元音符號的數目可以直接得知應唸成幾個音節。

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4 Egerod（1999）原文使用 j 及 w，意即分別為 julaq、gmujaw。Li（1980）亦使用 j 及 w。

5 根據線上辭典（https://e-dictionary.ilrdf.org.tw/tay/），尖石泰雅語進一步將 aw 發展為單元音，由相關詞彙 gmno’ [ɣəmənoʔ]「開玩笑、好玩」可得知。本文所指的線上辭典均為這個網址所查詢到的語料。另外，mgnaw’ 是以音位性的喉塞音（phonemic glottal stop）結尾，與 w 結尾形成對比，例如 bawnaw [βawnaw]「花生」（線上辭典 bonaw）。

詞尾滑音的書寫方式較有爭議，這類詞彙共同的特點是詞尾滑音與它前面的高元音發音部位類似，例如「路」、「後面」兩個詞彙的尾音有如下幾個可能的音韻分析：（1）元音–滑音音串 tuqiy、suruw（[iy]/[uw]/）、（2）延長的單元音 tuqii、suruu（[iː]/[uː]）或兩個相同元音（[ii]/[uu]/）、或（3）僅含單個元音 tuqi、suru（[i]/[u]）。以 tuqiy、suruw 的書寫方式為例，第一種作法以黃美金、吳新生（2018）語法書為例，用滑音符號標示較長的詞尾音，並借助詞尾喉塞音符號與尾音較短的詞作區分；後綴 -i（祈使句受事焦點）則採元音結尾的形式，如（2I）。另一種書寫方式（2II）僅使用喉塞音呈現對比，在部分的族語 E 樂園語料便是如此。[6] 第三種方式僅使用滑音符號呈現對比，例如（2III），泰雅爾語聖經（2022）便是採取這種方式。

（2）詞尾滑音及喉塞音

	尾音較長		尾音較短		加後綴 -i（/alax-i/）	
	「路」	「後面」	「孩子」	「文件」	「不可」	說明
I.	tuqiy	suruw	laqi’	biru’	laxi	含滑音及喉塞音符號
II.	tuqi	suru	laqi’	biru’	laxi	僅使用喉塞音呈現對比
III.	tuqiy	suruw	laqi	biru	laxiy	僅使用滑音符號呈現對比

（I）及（II）的兩種書寫方式，較適合詞尾喉塞音發音清楚的方言，而（III）的書寫方式，較為貼近詞尾喉塞音偏弱的發音形式。由此可知尾音是否以滑音書寫的複雜性，除了牽涉到尾音長短的對比是否明顯、是否要以滑音符號標示，也與方言間的詞尾喉塞音強弱有關，因此容易產生紛歧。關於詞幹尾音的其他討論另見第四節及第五節。

2.2 泰雅語的濁擦音 z

泰雅語濁擦音 z 的音位地位在文獻上的描述也不一致。不同於前人研究將 z 視為音位（例如 Li 1980），H. Huang（2015a）指出至少在桃園、新竹地區的賽考利克泰雅語中，[z/ʒ] 與 [j] 並非分屬 /z/ 及 /j/ 兩個獨立的音位，而是應該歸於同一個音位 /j/。也就是說

6 族語 E 樂園語料有 tuqi～tuqiy「路」、suru～suruw「後面」等不同的寫法。黃美金、吳新生（2018）兩位作者亦為泰雅語線上辭典編纂計畫的主持人。

[z/ʑ] 與 [j] 並無區辨意義的功能，發音上的擦音 [z] 是衍生而得的表層語音，來自滑音 /j/ 在特定環境強化的結果。某些詞彙的構詞音韻變化呈現滑音 /j/ 變為擦音的規律，例如 thay [təɦaj]「剩下來；保留」，加上後綴 -i（祈使句受事焦點）之後，thazi /tɦaj-i/ [təɦaʑi] 的詞尾滑音轉為濁擦音 [ʑ]。以 thazi 一詞的書寫為例，寫為表層的濁擦音而非原本的滑音較為適切，因為 [j] 與 [ʑ] 雖然不具音韻對比性，但是發音方式的差異明顯。

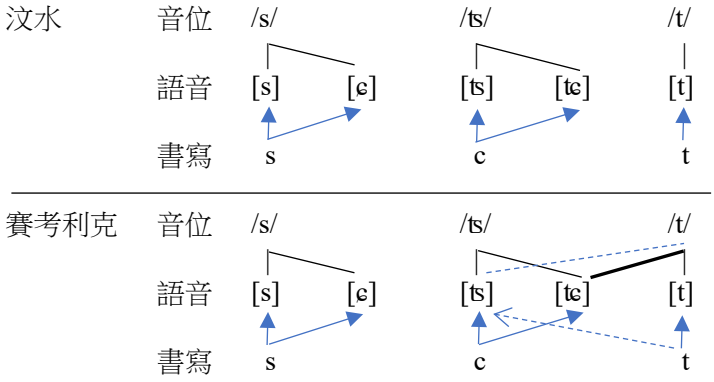
固有詞彙（native vocabulary）使用 z 的泰雅語方言，只限於賽考利克及澤敖利，對應的實際語音包括 [z] 及 [ʑ]，例如賽考利克 zmup /j<Vm>up/ [zɹmup]「吹（主事焦點）」（相關詞為 jupan /jup-an/「吹（處所焦點）」）、及 mhuziq /m-ɦujiq/ [məɦuʑiq]「濕（主事焦點）」。z 與 y 形成的雙字母（digraph）組合 zy，發音為國際音標 [ʑ]，是 /j/ 在 /i/ 以外的其他元音之前強化的結果，為一條可用（optional）規律，例如 qruyux [qərujux] ~ qruzyux [qəruʑux]「長」（族語 E 樂園–句型篇高中版–基本詞彙）、qbsuyan [qəβəsujan] ~ qbsuzyan [qəβəsuʑan]「兄姊」（線上辭典）。關於 z~zy 的變異請見第 3.3 節的討論。

2.3 塞擦音 c（/ʦ/）

舌尖（齒齦）塞擦音 c 在各個泰雅語方言的音韻地位不同。在四季、汶水、萬大、及宜蘭澤敖利方言，c /ʦ/ 是明確的音位，可與各種元音組合成音節，例如汶水泰雅語 caqis [ʦaqis]「縫紉（女性形式）」、maculing [maʦuliŋ]「燃燒」、claq [ʦɹlaq]「水田、泥巴」、wacilung [waʨiluŋ]「湖」等詞；符號 c 對應至 [ʦ] 或衍生的 [ʨ]，後者是 /ʦ/ 受到顎化規律（palatalization）影響而產生的變體。然而，在賽考利克及澤敖利（新竹、苗栗等地）方言，由於古語的 *c 變化為 s（Li 1981: 260），現今含音位 c 的固有詞彙有限，少數含有塞擦音 /ʦ/ 的詞彙例如賽考利克泰雅語 cbaq [ʦɹβaq]「教導」（相關語料請見吳新生 2008: 100–104），c /ʦ/ 的音位地位因歷史音變而變得較不明確。

符號 c 對應至 [ʦ] 和 [ʨ] 兩個不同的語音，這兩個音的音位歸屬在各個方言不盡相同，因為顎化規律影響的音段不同。顎化規律在汶水泰雅語影響了在 /i j/ 之前的 c /ʦ/ 和 s /s/，分別衍生出 [ʨ] 及 [ɕ]。由於顎化音僅在發音部位產生細微差別，衍生的變體使用相同的符號 c、s。顎化規律在賽考利克方言擴大影響到 /t/（下圖黑粗線），且顎化的 t 進一步變為塞擦音 [ʨ]。因為 [t] 與衍生的塞擦音 [ʨ] 在發音部位及發音方式均已改變，顎化之後的 t 常以符號 c 表示，便於反映明顯的語音差異。賽考利克泰雅語另有一條可用規律將詞尾 /t/ 的發音變為塞擦音 [ʦ]，例如 mit 「羊」發音成 [mit] ~ [miʦ]（Li 1982: 177–178），書寫符號一般仍以音位 t 表示，但也有直接反應語音的書寫方式 mic「羊」（吳新生 2008: 4）；這一條可用規律在下圖以虛線表示。

（3）顎化規律及符號 c 的關係



許多賽考利克泰雅語的詞彙含書寫符號 c，其實是因為 /t/ 顎化為 [tɕ]，而非來自於音位 /ts/，例如 pcinun /p-tinun/ [pətɕinun]「將編織」；含 t 的相關構詞形式 tminun /t<Vm>inun/ [təminun]「編織（主事焦點）」顯示這裡的 c 是由 t 變化而來的，真正含有音位 /ts/ 的詞彙不多。[7]

2.4 泰雅語的元音

泰雅語有五個元音符號 i、e、a、o、u，但是發音較為存古的方言僅有 i、a、u 三個。中元音 e、o 在歷史發展上有兩個來源，一是由 ay、aw（以及 ai、au 或甚至 ya、wa、ia、ua）漸變為單元音。二是高元音 /i u/ 受鄰近輔音的影響而導致舌位下降，尤其當同音節的韻尾輔音是 /q ħ/（或甚至 /ŋ/）這一類發音部位在口腔後方的輔音，例如 qulih「魚」的發音近似 [quleħ]、taruq「挖鋤」近似 [taroq] 等，因此偶爾會看到含中元音的書寫方式（quleh、taroq）。部分地區的泰雅語未發展出中元音，例如汶水泰雅語及桃山村的賽考利克泰雅語，在固有詞彙中便沒有 e、o。桃山村的賽考利克泰雅語維持 ay/aw 的發音，高元音即使受鄰近 q、h 影響，亦未明顯降為中元音，而許多其他地區的賽考利克泰雅語則呈現程度不一的元音下降或單元音化。是否發展出中元音 [e o] 是泰雅語主要音韻變異（variation）之一，也是各地區的發音特色。即使在同一地區，依不同年齡層或不同語者也可能有差異，例如「穿山甲」一詞，桃山部落的老年人讀為 [qawm] 但是較為年輕的語者發音為 [qom]（錢玉章 2001: 32）。

7 賽考利克泰雅語線上辭典的語料中，固有詞彙含 ca、cu 音串的詞彙僅個位數。ci 對應至較為存古的方言裡的 ti；是否有少數來自於音位 /ts/，仍有待後續研究。

除了這五個元音書寫符號，口語發音其實還包括了央中元音 [ə]、甚至有舌尖音 [ɿ] 及前高圓唇元音 [y]。賽考利克泰雅語的重音一般而言落在最後音節，[ə] 因為不出現在重音節，是否具有音位地位 （/ə/） 仍有爭議。舌尖音 [ɿ] 只出現在聲母為嚇音 （sibilant）（書寫符號 s、c、z）的音節中，因此可以將 [ɿ] 視為 [ə] 緊隨這兩個嚇音（sibilant）時的變體。弱元音 [əɿ] 在清音之後傾向清化，尤其是當前後都是清音且語速較快時，例如 qthuy [qə̥tə̥ɦuj]「胖」，在聽感上有時甚至接近消失；這個現象正如英語的例子 potato「馬鈴薯」的首音節弱元音在語速快時會清化。泰雅語書寫時一般會省略弱元音，例如賽考利克泰雅語 blaq [βəláq]「好」及 slaq [sɿláq]「水田、泥巴」，惟有當省略弱元音可能造成辨義或發音上的混淆時，才會考慮在書寫時標示出。

倒數第二之前的元音弱化規律，是賽考利克泰雅語的主要音韻規律之一，導致在詞尾重音之前可出現一連串含 [əɿ] 的開音節。如果書寫時將弱元音一律省去，便會產生書寫符號長串的輔音。在前人文獻裡，Egerod （1965; 1966; 1980; 1999）以及 Li（1980; 1981）對此有相關敘述，提到泰雅語寬式記音（broad transcription）的輔音串之間，含接近央中元音的發音，有時記為上標（raised）的 [ə]。這些著作對於輔音串之間的元音定位並不明確，兩位作者似乎認為輔音串間的弱元音，僅為相鄰輔音間在語音層次上不得不存在的過渡。音韻學理論的文獻中，例如 Yu （2003; 2007: 34–35, 75）以及 Blevins（2004: 242–243; 2008）等一系列出版，據此將賽考利克泰雅語詮釋為含音韻層次（而非書寫符號）的輔音串。H. Huang（2006b）基於弱元音在泰雅語詞中的分布，論證這些弱元音其實仍存在於音韻結構的音節韻核（nucleus），意即在尾重音之前存在著的是一連串開音節，而非同音節或異音節的（heterosyllabic）輔音串。第三節將深入討論書寫形式省略弱元音的議題。

賽考利克泰雅語的前高圓唇元音 [y]（國際音標）是元音 /u/ 受兩旁輔音影響而產生的變體。當 u 出現在滑音聲母（glide onset）y [j] 之後，且隨後的韻尾也是一個發音部位在口腔前部的輔音時，u 的發音部位常因同化作用往前移，因而產生接近 [y] 的發音，例如 yuyut [juɥýt] 「瓶子」、kblayun [kəβəlaɥýn] 「製作 （受事焦點）」、女子名 Sayun [saɥýn]、Yayut [jaɥýt] 等。這些例詞裡的前高圓唇滑音 [ɥ]，是因為原本的滑音 y [j] 受後面 u 的影響而變成圓唇。由於圓唇元音 [y] 出現的環境是可預測的，並非音位（cf. Rau 1992: 24），故不在書寫符號反映此發音細節。

2.5 泰雅語方言間主要語音音韻差異

泰雅語各個方言主要的語音音韻差異，由原始泛泰雅語（Proto-Atayalic）或原始泰雅語（Proto-Atayal）的重構（Li 1981; Goderich 2020）可以觀察到許多重點。以下（4）僅以幾個呈現方言差異的重要詞彙為例，根據共識成果報告書的六個語別列出相關語料。

（4）泰雅語語音音韻差異例詞：[8]

	賽考利克	四季	澤敖利	汶水	萬大	宜蘭澤敖利	語意
a.	squliq	cquliq	s’uli	cuquliq	ci’uli’	c’oli	人、別人
b.	huzil	hoyil	huzin	xuwil	hu<u>r</u>il	hoyin	狗
c.	qthuy	qthoy	kthuy	kithuw	katuhu<u>r</u>	thuy	胖
d.	mqeru’	qesuw	m’isu	maqisu’	ma’iru’	m’esu	九
e.	mopuw	mpux	mpuw	magalpug	malap<u>r</u>ow	mpu	十
f.	rom	rom	rawm	ragum	rong	rong	針

（5）主要的輔音差異（a–j）和元音差異（k–m）：

a. 四季、汶水、萬大、宜蘭澤敖利的塞擦音 c，對應至賽考利克及澤敖利 s，如（4a）；
b. 賽考利克、四季、汶水的 q 對應其他方言的喉塞音 [ʔ]，如（4a, d）；
c. 四季、澤敖利、宜蘭澤敖利的詞尾喉塞音弱化或消失，如（4a, d）；
d. 賽考利克及澤敖利有濁擦音 z，對應至其他方言的流音或滑音（變為濁擦音），如（4b）；
e. 詞尾的 l，在澤敖利及宜蘭澤敖利變化為 n，如（4b）；
f. 澤敖利、汶水、萬大、（宜蘭澤敖利）的 k，在賽考利克及四季（部分環境）變為小舌塞音 q，如（4c）；
g. 萬大的拍音 <u>r</u>，對應至其他方言的滑音，如（4c）；[9]
h. 四季、澤敖利、汶水、宜蘭澤敖利的 s 對應至賽考利克及萬大 r，如（4d）；
i. 濁擦音詞尾 g [ɣ] 僅在汶水出現，[10] 在其他方言變為 w、或清化為 x（四季）、或消失（宜蘭澤敖利），如（4e）；
j. 詞尾唇音在萬大及宜蘭澤敖利變為舌根音，其他方言則保留唇音，如（4f）；

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8 語料（4）來自族語 E 樂園（https://web.klokah.tw/）。與族語 E 樂園拼寫方式不同者包括（c）汶水 kithu 改為 kithuw（參考 Li 1981: 264 及筆者田調）；（d）賽考利克 mqeru 改為 mqeru’（參考線上辭典 https://e-dictionary.ilrdf.org.tw/、及筆者田調），汶水「九」根據筆者田調為 mamaqisu’，四季 mqesux ~ mqesu 改為 mqesuw（參考《四季泰雅族語言圖解式小辭典》2010: 90）；（e）汶水 magalpu 改為 magalpug（參考筆者田調及 Goderich 2020: 273）。

9 例詞（4b）也呈現了拍音 <u>r</u> 對應至其他方言的滑音，但在賽考利克及澤敖利另有 y 滑音在元音 i 之前強化為 z 的現象（H. Huang 2020）。

10 苗栗縣泰安鄉大興村 Matabalay 方言也允許詞尾 g /ɣ/（Li 1981: 256–257）。

k. 鄰近 q、h 的高元音 i、u 降為中元音，如賽考利克（4d）、四季（4b, c, d）、宜蘭澤敖利（4b）；
l. 單元音化可影響 ay/ai、aw/au、或甚至 ya/ia、wa/ua，進而產生中元音，例如賽考利克、四季、萬大、宜蘭澤敖利（4f）；相鄰的不同音節元音縮減為單音節雙元音，但未單元音化，如澤敖利（4f）；
m. 汶水及萬大除外，在其他方言，倒數第二個元音之前的元音呈現中和或弱化現象。[11]

雖然（4）的語料顯示澤敖利泰雅語倒數第二之前的中和元音為 [ə]（或 [ɿ]），書寫時被省略，但是在新竹縣五峰鄉的澤敖利泰雅語，倒數第二之前的中和元音（neutralized vowels）卻是 [a]。例如五峰鄉竹林村和平部落的澤敖利泰雅語（麥巴來；Maybalay）sa’uli’ [saʔuliʔ]「人、別人」、katahuy [katahuj]「胖」、ma’isu’ [maʔisuʔ]「九」、mapuw [mapuw] ~ magalapuw [maɣalapuw]「十」，若是不將低元音 a 寫出，則書寫方式與實際語音有明顯差距。五峰鄉大隘村茅圃泰雅語（西熬；Singaw）的中和元音亦是 [a]。在苗栗縣泰安鄉中興村、象鼻村等地的澤敖利泰雅語，倒數第二之前的中和元音大多數和賽考利克方言一樣為 [ə]，而五峰鄉麥巴來和西熬倒數第二之前的 [a] 僅傾向在語速快時有弱化為 [ə] 的情形，例如麥巴來 [katahuj] ~ [kətahuj]「胖」、matayu’ [matajuʔ] ~ [mətajuʔ]「六」。另外值得一提的是，賽考利克方言倒數第二個音節裡的元音可以是任何元音或 [ə]，例如 bqni’ [βəqəniʔ]「骨頭」，但是這個位置的 [ə] 對應至麥巴來方言亦是 [a]（ba’ani’ [βaʔaniʔ]），顯示古語中原有的 *ə 與 *a 的對比在麥巴來方言因為 [ə] 發展為 [a] 而消失了。[12]

方言間的差異有些也出現在方言內部。前面提到的關於弱化元音的討論，凸顯了方言內部書寫不一致的問題，其中一部分是因為實際發音本身就有所不同。因此，面對書寫形式的差異，我們需要歸類其原因：一些差異是因為各地區的母語者在發音上本就不同，例如詞尾音段的弱化或消失、唸為 y 或 zy、是否有單元音化或元音下降現象、弱化或中和元音是 [a] 或 [ə] 等；而另一些差異則是即使在發音完全相同的情況下，由於書寫原則的不同而有不同的書寫形式。以下將以賽考利克泰雅語的語料為主，進一步探討幾個重要的書寫議題及其背後的音韻規律。

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11 倒數第二個「元音」之前，在賽考利克泰雅語的許多詞彙裡也可稱作是在倒數第二個「音節」之前。不過，有時最後兩個元音併為一個音節，例如 gbon /ɣiβa-un/ [ɣəβon]「抱（受事焦點）」（H. Huang 2006a），這時在實際發音的倒數第二音節內的元音會弱化，這是因為它其實是在底層形式的倒數第三個元音（H. Huang 2006a）。這表示弱化或中和影響的是雙元音韻步（metrical foot）之外的元音，而這個雙元音韻步可以是單音節或雙音節。

12 這裡澤敖利泰雅語及第 3.1 節桃山賽考泰雅語的語料及觀察來自筆者田調筆記。另外，Maybalay [katahuj] ~ [kətahuj] 這一類的變異，顯示在泰雅語詞的右緣的兩個元音歸屬於韻步（metrical foot）內，因此較不易受弱化規律的影響（H. Huang 2018）。

3. 書寫符號輔音串之間是否含弱化元音

過去對於賽考利克泰雅語的研究著作，主要調查的方言點集中在新北市烏來區（Rau 1992; L. Huang 1993）、桃園縣復興鄉（Egerod 1965, 1966, 1980, 1999; Li 1980, 1981）、新竹縣尖石鄉（黃美金、吳新生 2018；線上辭典）、及宜蘭地區（李壬癸 1996；Chen 2011），以上僅舉部分著作為例。關於新竹縣五峰鄉、苗栗、台中、及南投等地方言的研究較少，例如錢玉章（2001）探討新竹桃山泰雅語，Yamada & Liao（1974）及廖英助（1990a; 1990b; 1995; 2014）描述台中市和平區環山部落泰雅語，及 2008 年南投縣政府出版的《南投縣原住民族語泰雅語圖解辭典》等。

賽考利克泰雅語內部存在著各種次方言差異，除了元音下降、單元音化、元音的中和或弱化之外，還包括弱化元音是否被刪除。這裡所指的詞中位置的元音刪除（vowel syncope）是指即使在慢速語流中，輔音串之間的弱元音也不存在。元音刪除在泰雅語文獻中的描述有限。賽考利克泰雅語既然同時有元音弱化及元音刪除規律，書寫時若是省略所有弱元音，相鄰的輔音符號將包含兩種意義，一是發音時中間有弱元音、二是發音時真正相鄰的輔音。由於泰雅語的音節不允許複雜的聲母及韻尾，相鄰的輔音實則分屬兩個不同的音節。

在線上辭典尖石泰雅語的語料中，除了含完成貌中綴 <in> 可能導致詞中閉音節外，固有詞彙詞尾重音之前一律都是開音節。然而桃山泰雅語及環山泰雅語因為元音刪除規律之故，詞尾重音之前的位置除了開音節也有許多不同形態的閉音節。本節將首先呈現桃山泰雅語及環山泰雅語的音韻形態，再討論其他與元音刪除規律無關的書寫符號輔音串。

3.1 桃山泰雅語的詞中閉音節

五峰鄉桃山村的賽考利克方言在音韻研究上具有相當的重要性。這個方言不僅元音的發音較為存古、前綴保留得較為完整，而且詞幹較少有刪略音段的情形。由於桃山泰雅語詞幹左緣的音段保存相對完整，出現書寫符號長串輔音的詞彙較多，這一特性提供了檢視輔音串發音及音韻推論分析上豐富的材料。

語料（6）列出了桃山泰雅語和尖石泰雅語部分詞彙的發音對照，尖石泰雅語的語料來自於線上辭典。泰雅語不同方言皆允許詞尾閉音節（H. Huang 2015b），這裡的記音按慣例以方括號內的英文句點表示音節界線，側重於呈現非詞尾閉音節的分布。緊接嚇

音之後的弱元音因其位置、是否出現在閉音節、或是否前後均為嚇音而產生的細微的發音部位差異或變異（variation），以及弱化元音在自然語流有時會出現的清化，在此予以忽略。

（6）桃山泰雅語：韻步外傾向形成詞首閉音節（較長詞彙）

	桃山泰雅語書寫及發音		尖石泰雅語書寫及發音		語意
a.	splawa’	[səp.la.waʔ]	splawa’	[sɿ.pə.la.waʔ]	喊叫（周邊焦點）
b.	mtbbang	[mət.βə.βaŋ]	mtbbang	[mə.tə.βə.βaŋ]	歪、斜、橫
c.	pkbsukun	[pək.βə.su.kun]	pkbsukun	[pə.kə.βə.su.kun]	將被灌醉
d.	mqtuqi	[məq.tu.qi]			守規矩、聽話
e.	m’tlaka’	[məʔ.tə.la.kaʔ]			變成霜
f.	msramu’	[məs.ra.muʔ]	msramu’	[mə.sə.ra.muʔ]	流血（主焦）
g.	msgaliq	[məs.ɣa.liq]	msgaliq	[mə.sə.ɣa.liq]	破（主焦）
h.	psblaq	[pəs.βə.laq]	psblaq	[pə.sə.βə.laq]	使和好
i.	lhlahuy	[ləħ.la.ħuj]	lhlahuy	[(ħə.) lə.ħə.la.ħuj]	森林 [13]
j.	thmqan	[təħ.mə.qan]	thmqan	[tə.ħə.mə.qan]	撒尿、小便
k.	shkangi’	[səħ.ka.ŋiʔ]	shkangi’	[sə.ħə.ka.ŋiʔ]	尋找（周邊焦點）
l.	qbhniq	[qəβ.ħə.niq]	qbhniq	[qə.βə.ħə.niq]	鳥
m.	mgzbuq	[məɣ.zɿ.βuq]			起得早
n.	t**m**mlikuy	[təm.mə.li.kuj]			喜歡找男人（主焦）
o.	q**m**nhut	[qəm.nə.ħut]			曾擋住（主焦）
p.	g**m**rgir	[ɣəm.rə.ɣir]	g**m**rgir	[ɣə.mə.rə.ɣir]	篩（主焦）
q.	s**m**’atu’	[səm.ʔatuʔ]	s**m**’atu’	[sə.mə.ʔatuʔ]	播種祭；標記範圍
r.	s**m**r’zyut	[səm.rə.ʔə.ʐut]	s**m**rzyut	[sə.mə.rə.ʐyt]	整理（主焦）
s.	l**m**nglung	[ləm.ŋə.luŋ]	l**m**nglung	[lə.mə.ŋə.luŋ]	思考（主焦）
t.	lnglungun	[ləŋ.lu.ŋun]	lungun	[lu.ŋun]	思考（受焦）
u.	sr’zyut	[sər.ʔə.ʐut]	srzyut	[sə.rə.ʐyt]	整理（祈使）
v.	plmukan	[pəl.mu.kan]	plmukan	[pə.lə.mu.kan]	漢人

由（6）的語料可以觀察到，桃山泰雅語的詞首允許閉音節以各種不同的輔音結尾，包括塞音（a–e）、擦音（f–m）、鼻音（n–t）、流音（u–v）、滑音等，[14] 對應至尖石泰雅語的語料均為開音節。詞首閉音節的韻尾輔音，可以是某個前綴或中綴，例如（6f）m-

[13] 線上辭典文字為 lhlahuy，但是音檔為 [ħə.lə.ħə.la.ħuj]。

[14] 詞首閉音節的韻尾輔音也可以是帶音位性的滑音，但是另牽涉到多個其他規律。例如「跑道、運動場」在桃山泰雅語是 payqnahan [paj.qə.na.ħan]，在尖石泰雅語是 pqnahan [pə.qə.na.ħan]。由於「跑」的主事焦點形式是 mqzinah /m-qjinaħ/ [mə.qə.ʐi.naħ]、含有 /j/，由此可推知尖石泰雅語 [pə.qə.na.ħan] 省略了 /j/ 起始的音節，而桃山泰雅語 [paj.qə.na.ħan] 含有 /q/ 與 /j/ 的換位。

s-ramu’[15] 及（6n–s）的 <m>（中綴在這裡以粗體表示），也可以是詞根的一部分，如（6k）s-hkangi’ 當中的 h、（6l）qbhniq 當中的 b。因此，由書寫符號輔音串詮釋桃山泰雅語的發音時，如果第二個輔音與第三個輔音之間不唸弱元音，較為接近這個地區的方言特色。

關於詞首閉音節的形成，其實在桃山泰雅語有一些變異及例外。一般而言，當第二個輔音是鼻音或擦音、尤其是清擦音，例如（6n–s）以及（6f–k），形成詞首閉音節的傾向相當穩定。但如果第二個輔音不是鼻音或清擦音，詞首閉音節偶而出現不穩定的變異，例如 mqzinah [məq.ʑi.naħ] ~ [mə.qə.ʑi.naħ]「跑（主事焦點）」、mgzbuq [məɣ.zɻ.βuq] ~ [mə.ɣə.zɻ.βuq]「早」、sl’ngux [səl.ʔə.ŋux]「使…尖」但是 sl’ngxan [sɻ.lə.ʔə.ŋə.xan]「使…尖（處所焦點）」不刪除第二個弱元音。在尖石泰雅語線上辭典的語料，有極少數 <m> 在韻尾（coda）的詞中閉音節，例如 qmbuyang [qəm.βu.jaŋ]「打獵、狩獵」，顯示在尖石泰雅語詞彙裡，以鼻音結尾的詞中閉音節在某些環境漸被接受。

桃山泰雅語詞首閉音節的例外情形，除了與第二個輔音是否為鼻音或擦音有關，其他大多含重疊結構。舉例而言，mnama’ [mə.na.maʔ]「準備」的重疊式 m**nm**nama’，發音為 [mə.**nəm**.na.maʔ] 而非 *[mə**n.mə**.na.maʔ]；由於重疊綴的左緣必須是音節的起始，閉音節偏離了詞首位置。在固化（fossilized；或稱僵化）重疊詞亦是如此，例如 m**bl**bil [mə.βəl.βil]「發抖」、而非 *[məβ.lə.βil]。有時重疊詞綴導致和尖石泰雅語一樣的連續開音節，例如 msu’ut [məsuʔut]「阻塞」加上單音節重疊綴之後的發音為 mssu’ut [mə.sə.su.ʔut]、而非 *[məs.su.ʔut]。這些看似詞首閉音節的例外顯示重疊構詞會干擾詞首閉音節的形成。重疊構詞產生非預期的形式，因為有規則可循，並不算是真正的音韻例外。

以下（7）的語料詞彙的長度較短，所形成的閉音節是首音節、同時也是倒數第二音節。和（6）較長詞彙的語料相似的是，許多的韻尾輔音是鼻音和擦音。

（7）桃山泰雅語：韻步內鼻音及清擦音之後的弱元音有時省略（較短詞彙）

	桃山泰雅語書寫及發音		尖石泰雅語書寫及發音		語意
a.	h**m**bing	[ħəm(ə).βiŋ]	h**m**bing	[ħə.mə.βiŋ]	漏（主焦）
b.	s**m**pung	[səm(ə).puŋ]	s**m**pung	[sə.mə.puŋ]	丈量（主焦）
c.	q**m**pul	[qəm(ə).pul]	q**m**pul	[qə.mə.pul]	踏（主焦）
d.	k**m**tu’	[kəm(ə).tuʔ]	k**m**tu’	[kə.mə.tuʔ]	啃（主焦）

[15] 構詞組成為 m-（主事焦點）、s-「流、排放」（黃美金、吳新生 2018: 29），詞幹 ramu’「血」。

續上表

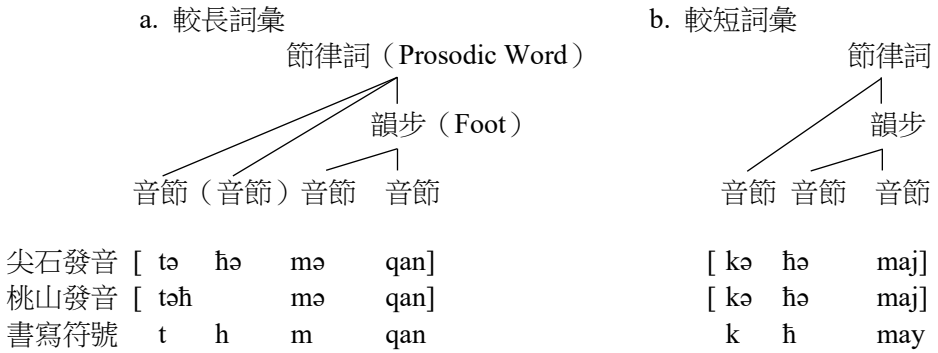
e.	q**m**zyu’	[qəm(ə).ʑuʔ]	q**m**zyu’	[qə.mə.ʑuʔ]	傳染（主焦）
f.	t**m**hay	[təm(ə).ɦaj]	t**m**hay	[tə.mə.ɦaj]	保留、剩下（主焦）
g.	t**m**ring	[təm(ə).riŋ]	t**m**ring	[tə.mə.riŋ]	觸摸（主焦）
h.	s**m**li’	[səm(ə).liʔ]	s**m**li’	[sə.mə.liʔ]	儲存（主焦）
i.	t**m**nu’	[təm(ə).nuʔ]			曾使喚、曾指派（主焦）
j.	tnhay	[tən(ə).ɦaj]	tnhay	[tə.nə.ɦaj]	曾保留、曾剩下
k.	snli’	[sən(ə).liʔ]	snli’	[sə.nə.liʔ]	曾儲存
l.	tnring	[tən(ə).riŋ]	tnring	[tə.nə.riŋ]	曾觸摸
m.	mnbuw	[mən(ə).βuw]	mnbuw	[mə.nə.βuw]	喝（主焦）
n.	snhi’	[sən(ə).ɦiʔ]	snhi’	[sə.nə.ɦiʔ]	相信
o.	qsliq	[qəs(ə).liq]	qsliq	[qə.s(ə).liq]	中意、愛慕

由於泰雅語構詞的特性，許多例詞含有中綴 <m>。比起較長詞彙的詞首閉音節，較短詞彙形成閉音節的傾向較不穩定。例如，（7m）的相關詞 pnbuw [pə.nə.βuw] ~ [pən.βuw]「將喝」、tmlux [tə.mə.lux] ~ [təm.lux]「沉默」、mnkum [mə.nə.kum] ~ [mən.kum]「暗」，以及含中綴 <n> 的 qnxan [qənəxan]「生活」、lnpuw [lə.nə.puw]「讀過、數過」等許多詞彙仍常有倒數第二含弱元音的開音節。鼻音 ng [ŋ] 同樣也有變異，例如 zngli’ [zə.ŋə.liʔ] ~ [zəŋ.liʔ]「小蒼蠅」。其他類型的輔音成為韻尾的情況更不穩定，例如 qlcing [qə.lə.tɕiŋ] ~ [qəl.tɕiŋ]「木板」、khmay [kə.ɦə.maj] ~ [kəɦ.maj]「厚」、kbhul [kə.βə.ɦul] ~ [kəβ.ɦul]「百」、qthuy [qə.tə.ɦuj] ~ [qət.ɦuj]「胖」等。含中綴 <m> 的詞也可找到例外，例如 l<m>nguw [ləm.ŋuw] ~ [lə.mə.ŋuw]「燉（主事焦點）」、tmnga’ [təm.ŋaʔ] ~ [tə.mə.ŋaʔ]「觀看（主事焦點）」、kmluh [kəm.luɦ] ~ [kə.mə.luɦ]「收割（主事焦點）」。少數含中綴 <m> 但是倒數第二開音節內的弱元音穩定存在的詞彙，例如 t**m**maq（/t<Vm>maq/ 或 /t<Vm>Vmaq/）[tə.mə.maq]「打爛（主事焦點）」（*[təm.maq]），應該是為了避免完全相同的輔音彼此相鄰。

（7）的語料顯示當聲母是鼻音或清擦音時，倒數第二的弱元音可以被省略；但是，與較長詞彙中的第二個弱元音比較起來，較短詞彙裡的倒數第二閉音節明顯地較不容易形成。這與泰雅語將最後兩個元音歸為一個韻步有關（H. Huang 2018）。相對於韻步以外的元音，韻步內的元音處於節律結構上較為強勢的位置，因此倒數第二元音較不容易受到元音刪除規律的影響。在較短詞彙中，因為第二個輔音之右的元音同時也是倒數第二個元音，位於韻步之內，因受到韻步結構保護導致形成詞首閉音節的規律沒有完全發生作用。反觀在較長的詞彙（6）中，第二個輔音之右的元音位於韻步之外，所以不會受

到韻步結構的干擾，詞首閉音節因而較為穩定。除了韻步結構這個因素之外，另有韻尾輔音的語音特性及重疊構詞等因素與形成詞首閉音節的規律產生互動。

（8）賽考利克泰雅語韻步結構影響元音刪除規律：比較不同長度的詞彙



結構圖（8）呈現了尖石泰雅語和桃山泰雅語輔音串發音的典型差異。比較在不同位置的相同輔音串之間的弱元音，在桃山泰雅語韻步之外的位置常被省略、在韻步之內時常存在（亦可能刪除，例如語料（7））；在尖石泰雅語則沒有這樣的差別。這個對比凸顯出賽考利克泰雅語次方言不同的特性。韻步結構在桃山泰雅語的發音扮演重要的角色，因此韻步內外的弱元音刪除型態不同；而音節的考量在尖石泰雅語較為重要，因此只要是非詞尾位置一般而言均須為開音節，並無韻步內外的差異。

桃山泰雅語發音上倒數第二的閉音節，是原本出現在倒數第二開音節的弱元音刪除之後音節重整（resyllabification）的結果。從歷史音變的角度來看，以（7o）qsliq「中意、愛慕」為例，原始泰雅語（Proto-Atayal）*kisəliq（Goderich 2020: 118）發展為賽考利克 [qəs(ə)liq] 及汶水 [kisliq]，原本的聲母 s 在 *ə 丟失之後被重新劃分為前面音節的韻尾。[16] 在共時音韻的分析中，若是假設倒數第二元音存在於基底型式（underlying representation），便可直接以韻步內的元音受到保護來解釋為何倒數第二開音節內的弱元音較不容易刪除。如果假設倒數第二弱元音的 [ə] 來自於避免韻尾輔音而產生的元音加插，這是屬於音節層次的考量，無法解釋為何桃山泰雅語倒數第二元音比起詞首音節，較不受閉音節形成規律的影響。

[16] 汶水泰雅語的例詞（4c）kithuw「胖」和（4e）magalpug「十」，也是倒數第二弱元音刪除的結果。

至於較長詞彙的詞首閉音節，由歷史音變的角度來看也是來自於元音刪除而非元音加插，但是共時音韻分析的不確定性較高。H. Huang（2018）認為若是共時音韻中已不再出現構詞相關形式之間元音存在或消失的替換現象（vowel-zero alternation），歷史上的元音刪除規律確實可能由於簡化基底型式的普遍考量、將倒數第二之前的元音從基底型式移除，進而發展出共時音韻中的元音加插規律。然而，即使缺乏元音替換現象，並不能排除共時音韻中保有基底型式元音的可能性。不論是刪除或加插的分析方式，都不影響這裡所談的桃山泰雅語的較長詞彙形成詞首閉音節的傾向。

總括言之，當弱元音只出現在部分輔音之間，書寫符號輔音串與實際發音的對應就變得較為複雜。桃山泰雅語詞彙左緣的兩個輔音常常自成一個音節，意即第二個輔音之後不發弱元音。但是這個規律和多個因素有互動關係，包括預期出現在這個輔音右側的弱元音是否同時也是倒數第二元音，這個輔音是否為鼻音或擦音，以及是否為重疊詞綴的起始等。

3.2 環山泰雅語的詞中閉音節

僅部分輔音之間含弱元音的情況，也出現在台中市和平區環山（Sqoyaw）部落的賽考利克泰雅語。廖英助（1990a; 1990b; 1995; 2014）的一系列著作已注意到，如果完全省略表示弱元音的符號，無法精確地反映環山泰雅語的發音，因此他選擇了在書寫時以符號 ö 表示 [ə]，例如部落名 söqoyaw、而非 Sqoyaw；未標示 ö 之處，便代表發音上真正的輔音串。廖英助（1990a; 1990b）的文章各含將近四十頁、九十頁以族語記錄的長篇口述故事及中文翻譯。1995 年的文章是關於環山部落見聞記錄、內有許多習俗用語及常用詞彙。2014 年的泰雅爾族語–漢語辭典，收錄了自 1971 年起訪問多位元老及不同世代長者的語料，以環山部落為主，共 1703 頁。如此豐富的書面資料以反映口語發音的方式呈現，使我們得以一窺環山泰雅語發音與書寫符號輔音串之間的關係。

以下環山泰雅語的語料（9）至（11）來自於廖英助（1990b），包括了原文含 ö 的記錄方式、原文的中文翻譯、出現相關例詞的頁碼，以及筆者根據書面紀錄的符號 ö「還原」而來的國際音標記音[17]，以便呈現音節形態的分布。另外，為了與本文其它的賽考利克語料對應，亦列出常見的完全隱藏弱元音的書寫方式。首先檢視較長的詞彙，即第

[17] 這裡對於環山泰雅語的記音側重於呈現詞彙裡開音節及閉音節分布。至於個別音段的實際發音，例如書寫符號的 b、h 的語音體現，或央中元音舌尖化等議題，係根據尖石及桃山賽考利克泰雅語發音，有待田野調查確認。請參考 Yamada & Liao（1974）關於各個音位發音的描述。

二個輔音之右的元音在倒數第二元音之前。第二個輔音依序為塞音、擦音、鼻音、及流音。語料顯示當第二個輔音是清擦音時，形成詞首閉音節的傾向相當明確；塞音和濁擦音不會形成詞首音節的韻尾。若為鼻音或流音，則有許多變異。

（9）環山部落賽考利克泰雅語：韻步外清擦音之後的弱元音傾向省略（較長詞彙）

	原文詞彙	隱藏弱元音	發音	原文翻譯	頁碼
a.	söpöqaniq	spqaniq	[sə.pə.qa.niq]	給我吃	79
b.	mötöbuchi	mtbuci	[mə.tə.βu.tɕi]	分家	94
c.	sökölokah	sklokah	[sə.kə.lo.kaħ]	滋補、強身	82
d.	pöqömahun	pqmahun	[pə.qə.ma.ħun]	農耕之事務	119
e.	pö’öbasan	p’basan	[pə.ʔə.βa.san]	增加、另外再加	105
f.	pösbötuwan	psbtuwan	[pəs.βə.tu.wan]	生蛋籃	84
g.	pösngönguwan	psngnguwan	[pəs.ŋə.ŋu.wan]	嚇唬	80
h.	mösbölaq	msblaq	[məs.βə.laq]	和諧、要好	123
i.	möhkangi	mhkangi	[məħ.ka.ŋi]	步行	111
j.	pöhpuyan	phpuyan	[pəħ.pu.jan]	煮物用具	95
k.	pöhköngiyan	phkngiyan	[pəħ.kə.ŋi.jan]	步行距離	120
l.	köböhuyaw	kbhuyaw	[kə.βə.ħu.jaw]	增加	84
m.	pögösasan	pgsasan	[pə.ɣə.sa.san]	清晨	84
n.	k**öm**kögiy	kmkgiy	[kəm.kə.ɣij]	織蔴事	91
o.	h**öm**öböku	hmbku	[ħə.mə.βə.ku]	發芽	100
p.	h**öm**öröhil	hmrhil	[ħə.mə.rə.ħil]	鋸木	114
q.	s**öm**öyunaw	smyunaw	[sə.mə.ju.naw]	繼承	95, 136
r.	pönliyaw	pnliyaw	[pən.li.jaw]	東勢鎮	99
s.	könöyuwaw	knyuwaw	[kə.nə.ju.waw]	隔間、置物室	80
t.	qönöriyang	qnriyang	[qə.nə.ri.jaŋ]	木材、木段	83
u.	löngölungun	lnglungun	[lə.ŋə.lu.ŋun]	思考	77
v.	sölöngosan	slngosan	[sə.lə.ŋo.san]	尖銳化	82
w.	söröqöyan	srqyan	[sə.rə.qə.jan]	中毒	88
x.	hörhiran	hrhiran	[ħər.ħi.ran]	鋸	126

在較短詞彙中，也出現清擦音容易成為閉音節韻尾的傾向，如（10）所示。也就是說，環山泰雅語的清擦音 s、h，不論其出現的位置為何，[18] 均容易導致之後的弱元音省略。其他類型的聲母，則只有少數的例子誘發弱元音省略，如語料（11）。

[18] 另有舌根清擦音 x [x]，但是出現的頻率低，尚未發現相關的語料。

（10） 環山部落賽考利克泰雅語：韻步內清擦音之後的弱元音傾向省略（較短詞彙）

	原文詞彙	隱藏弱元音	發音	原文翻譯	頁碼
a.	qösliq	qsliq	[qəs.liq]	心理	86, 137
b.	mösbing	msbing	[məs.βiŋ]	甜	91
c.	köska	kska	[kəs.ka]	中間	92
d.	mösli	msli	[məs.li]	集中、聚集	150
e.	köhmay	khmay	[kəh.maj]	很多人	78, 136
f.	töhmuq	thmuq	[təh.muq]	灑尿	89
g.	löhbun	lhbun	[ləh.βun]	腸；心思	91, 153
h.	möhnuk	mhnuk	[məh.nuk]	軟	126

（11） 環山部落賽考利克泰雅語：韻步內非清擦音的聲母之後傾向保留弱元音（較短詞彙）

	原文詞彙	隱藏弱元音	發音	原文翻譯	頁碼
a.	söpöyang	spyang	[sə.pə.jaŋ]	了不起	80
b.	mötönaq	mtnaq	[mə.tə.naq]	相同	91
c.	tökörul	tkrul	[tə.kə.rul]	找野生食物	92
d.	pöqöbaq	pqbaq	[pə.qə.βaq]	深入了解	76
e.	bö’önux	b’nux	[βə.ʔə.nux]	平坦	96
f.	köböhul	kbhul	[kə.βə.ħul]	百	100
g.	mögöluw	mgluw	[mə.ɣə.luw]	跟從	78
h.	k**öm**öluh	kmluh	[kə.mə.luħ]	收穫小米	88, 129
i.	q**öm**ötuy	qmtuy	[qə.mə.tuj]	結成一團團的	98
j.	s**öm**öxu	smxu	[sə.mə.xu]	臼、打、搗	130
k.	s**öm**öru	smru	[sə.mə.ru]	支持、支撐	151
l.	mönökum	mnkum	[mə.nə.kum]	暗黑的	92
m.	lönöqing	lnqing	[lə.nə.qiŋ]	收藏、貯存	91
n.	mönöbuw	mnbuw	[mə.nə.βuw]	飲	144
o.	sönöhi	snhi	[sə.nə.ħi]	相信	158
p.	töŋöching	tngcing	[tə.ŋə.ʨiŋ]	台斤	100
q.	löŋölung	lnglung	[lə.ŋə.luŋ]	想一想	135, 138
r.	qölöching	qlcing	[qə.lə.ʨiŋ]	木板	97
s.	tölöqing	tlqing	[tə.lə.qiŋ]	玩捉迷藏	81
t.	pörö’un	pr’un	[pə.rə.ʔun]	砍倒	99
u.	hörhil ~ höröhil	hrhil	[ħər.ħil] ~ [ħə.rə.ħil]	鋸	126, 114

雖然（9）至（11）含鼻音後元音刪除的例子較少，但是在廖英助（2014）辭典當中，除了有許多鼻音之後未省略 [ə] 的詞彙、例如頁 1373 至 1388 一連串以 sömö [səmə] 開頭的詞，也不乏 söm 之後接 b、c、g、k、l、m、n、p、q、r、s、t 及喉塞音等各種不同輔音的例子，顯示在環山泰雅語也常省略鼻音之後的弱元音。鼻音結尾的閉音節可出現在

詞首或倒數第二位置，例如 hömböku「萌芽」（頁 455）、hömbiyat「拔除」（頁 454）、hömkangi「找尋」（頁 464）、hömbing「漏水」（頁 453）。鼻音後的元音刪除也常有變異，例如 sömölöxun 或叫 somlöxun「無故挑釁」（頁 1379）、sömguq 即 sömöguq「小米播種後發芽，長約 2~3 公分的新芽」（頁 1360）、qömtam 或叫 qömötam「吞下」（頁 1182）等。Yamada & Liao（1974）提到 /m s q h/ 四個輔音之後的弱元音容易刪除而造成輔音串。不過，廖英助（1990a; 1990b; 1995; 2014）的語料顯示，清擦音之後的弱元音比起鼻音之後的弱元音更容易省略，而鼻音之後的弱元音比塞音之後的弱元音更容易省略。塞音之後弱元音刪除的詞彙很少。

整體而言，環山泰雅語書寫符號輔音串主要來自於清擦音之後的弱元音省略，而桃山泰雅語最主要是第二個輔音之後的弱元音省略。桃山泰雅語倒數第二個開音節之內的弱元音會因為受到韻步的保護而呈現和韻步之外弱元音不一樣的刪略形態。在環山泰雅語，關鍵性的因素是輔音本身是否為清擦音或鼻音，而非位置；有時甚至可以省略兩個弱元音，例如，pöshömqilun [pəs.ħəm.qi.lun]「使之煮熟」（廖英助 2014: VIII）。[19] 以下（12）的例詞，分別呈現詞中位置 bh、lh、kh、ks 四種輔音串在尖石、桃山、與環山三個賽考利克泰雅語發音的對比。

（12） 尖石、桃山、與環山泰雅語輔音串的發音對比

	書寫符號	尖石泰雅語	桃山泰雅語	環山泰雅語 [20]	語意
a.	qbhniq	[qə.βə.ħə.niq]	[qəβ.ħə.niq]	qöböhniq [qə.βəħ.niq]	鳥
b.	klhmiq	[kə.lə.ħə.miq]	[kəl.ħə.miq]	kölöhmiq [kə.ləħ.miq]	薄（前綴 k-）
c.	mhnuk	[mə.ħə.nuk]			軟
	pkhnkaw		[pək.ħə.nə.kaw]		使便宜（軟）
	skhnuk			sököhnuk [sə.kəħ.nuk]	便宜
d.	pkskut	[pə.kə.sɻ.kut]			將緊縮
	pks’ang		[pək.sɻ.ʔaŋ]		將罵人
	pkskan			pököskan [pə.kəs.kan]	射中目標

[19] 廖英助（2014: XIII）對於辭典的簡介中，提到弱元音省略可產生同音節的輔音串，例如 sömbleqan ~ sömböleqan、söböleqan ~ sböleqan ~ söbleqan「要好、和諧」當中的 bl、sb。這些例子相當特殊，因為泰雅語一般而言不允許複雜的音節聲母。Davidson（2006）研究英語詞首輔音之間弱元音（#CəC-）的發音，發現當第一個輔音為擦音、或第二個輔音為流音 /l/ 時，比起第一個輔音是塞音時更容易產生 [ə] 刪略，而且這些容易誘發 [ə] 刪略的輔音也常會形成原本這個語言不允許的輔音組合，例如 #fət 變為 #fṭ。Davidson 認為這個現象並非真正的元音刪除，而是鄰近音段間的構音交疊（gestural overlap）。環山泰雅語弱元音省略型態與 Davidson 所描述的非常類似，有待日後較為深入的語音學研究。

[20] 環山泰雅語例詞分別取自廖英助（2014）第 1154、675、1341、1036 頁。

由以上討論可以得知，賽考利克方言弱元音的分布，各地區存在著差異。由於有許多變異的因素影響桃山及環山泰雅語的發音，若是書寫時將弱元音悉數依實際發音寫出，勢必造成書寫形式相當大的分歧；而且，因為其本質是發音原本就不盡相同，整合書寫形式的難度較高。若是將弱元音完全隱藏不寫，對於非詞尾位置一律為開音節的次方言（尖石；<in> 形式除外）是相當簡潔的作法，但是對於允許詞中閉音節的次方言（桃山、環山）而言便容易產生混淆，在編纂教材或辭典時需要另外註明，才能讓使用者較為精確地掌握詞彙的發音。

3.3 CG——一般輔音後接滑音符號

滑音的語音音韻特徵介於元音及輔音之間，因此在許多議題上都容易因其不定性而需要明確釐清。本文第 2.1 節曾提及泰雅語的表層滑音分為帶音位性及元音性兩類。當輔音符號後接滑音符號（CG）時，這兩類 CG 的發音有所不同。

根據 Yamada & Liao（1974）的描述，環山泰雅語共有三或四種輔音串。第一種是輔音後接「半元音」、例如 [lə.pjuŋ]「親戚」，第二類含詞綴、例如 [pin.sə.βə.kan]「出生地」，第三類即 /m s q h/ 之後省略 [ə] 而產生的輔音串、例如 [məħ(ə).qi.jaʔ]「渴」；另有第四類輔音串和重疊結構有關。上述（9–10）的語料屬於 Yamada & Liao 所歸類的第三種輔音串，而（11u）的例子 [hər.ħil] 則屬於第四種輔音串。以下討論第一類及第二類的輔音串。

CG 的滑音 G 若是由元音衍生而來的，這類滑音和前面的輔音之間一定沒有弱元音存在，因為其音韻本質是元音；Yamada & Liao（1974）所謂的第一種輔音串即是這一類，例子 lpyung [lə.pjuŋ]「親戚」當中的 CG 並不是音韻上真正的輔音串。另一方面，CG 裡的滑音也可能是音位性滑音（phonemic glide），由於音位性滑音本就是輔音性質，書寫符號含輔音後接音位性滑音時，自然也會牽涉到輔音串間的弱元音是否存在的議題。總括來說，輔音–表層滑音的發音有三種可能：第一是 CG 間有 [ə]（或 [ɿ]）（13a），第二是 CG 之間沒有 [ə] 但分屬不同音節（13b），第三是 CG 之間沒有 [ə] 且在同一音節內（13c, d）。若是再進一步根據滑音的音韻地位分析，可以歸類為以下四類情況：

（13） 泰雅語表層滑音的音韻本質與弱元音省略之間的關係（此處書寫不含底線_及符號 z）

	CG 中的 G	書寫符號	尖石發音	桃山發音	語意
a.	音位性滑音 [Cə.G]	m**y**angi’	[mə.**j**a.ŋiʔ]	[mə.**j**a.ŋiʔ]	久病
b.	音位性滑音 [C.G]	kin**y**aqih （th**y**ayun）	[kin.**j**a.qiħ] （[tə.ħə.**j**a.jun]）	[kin.**j**a.qiħ] [təħ.**j**a.jun]	壞 能夠（受焦）
c.	音位性滑音 [.CG]	k**y**alan	[k**j**a.lan]	[k**j**a.lan]	說（處焦）
d.	元音性滑音 [.CG]（/CV/）	hb**y**atun	[hə.β**j**a.tun]	[hə.β**j**a.tun]	拔（受焦）

音位性滑音和前面緊鄰的輔音分屬不同音節（13b）、而元音性滑音與前面的輔音被劃入同一音節內（13d），這是泰雅語滑音分為兩類的重要依據。（13c）其實是（13a）進一步變化而來的形式，導因於一條獨立的規律將音位性滑音之前的弱元音刪除（H. Huang 2014）。另外值得一提的是，（13b）這一類的例詞在尖石泰雅語僅限於包含 <in> 的形式（見以下第六節討論），也就是 Yamada & Liao 的第二種輔音串。桃山泰雅語因為詞首閉音節形成規律，因此 [C.G] 不限於 <in> 加綴形式，例如 （13b） [təħ.ja.jun] 當中的 [ħ.j]。

如（13）所示，書寫符號輔音串 CG 有三種發音方式，完全隱藏弱元音無法反映泰雅語 CG 的發音對比。若是希望初學泰雅語語音的學習者可以由羅馬拼音掌握發音，就需要增加附加符號或語音細節。以下討論目前書面文獻上所觀察到的幾種方式。

第一種方式是預設書寫符號輔音串之間的弱元音一律省略，只有當 [Cə.G]（13a）當中的 [ə] 省略會造成發音混淆時才將其寫出。目前的泰雅語線上辭典便是採取這種作法，以底線標示出弱元音所在，例如 m_yangi’ [mə.ja.ŋiʔ]、m_yan [mə.jan]「像」、phb_yaw [pə.ħə.βə.jaw]「將追逐」、h_winuk [ħə.wi.nuk]「腰部」，以及黃美金、吳新生（2018: 19, 214）的 hk_yan [ħə.kə.jan]「轉彎」、th_yayun [tə.ħə.ja.jun]「能力足夠」、s_yukun [sɻjukun]「燒除獸毛」等。[21] 黃美金、吳新生（2018: 21–22）列出許多詞彙凸顯 CG 發音對比的問題，並使用底線標示弱元音位置以避免拼讀上的困擾。若以（13）的分類方式說明這組語料，加了底線的詞彙均含音位性滑音（屬於 13a），而沒有底線的詞彙則混合了（13c–d）兩類滑音；如（14）的分類一欄所示。判斷歸類的方法是依據它們各自的構詞相關形式（H. Huang 2014）。[22]

[21] 尖石泰雅語線上辭典的 hk_yan [ħə.kə.jan]「轉彎」、th_yayun [tə.ħə.ja.jun]「能力足夠」分別寫為 hk’yan、th’yayun、s’yukun，是誤將喉塞音符號認知為弱元音的結果，而非這些詞彙的發音含 [ʔ]。輔音符號在教學時，常常需要在後面加上元音，例如符號’在泰雅語教學時唸為 [ʔə]、l 唸為 [lə]，以此類推。由於喉塞音本身無顯著聽感特徵，而是透過對鄰近音的影響感知其存在，因此要標示出 [ə]（或 [ɻ]）時，容易誤以為是喉塞音符號’。喉塞音相關討論請見第五小節。

[22] 如何區分泰雅語音位性及元音性滑音、以及關於音位性滑音的這三種分布情形，請見 H. Huang（2014）。

（14） 尖石泰雅語 CG 音串的歸類（書寫形式取自黃美金、吳新生 2018: 22）

	書寫	發音[Cə.G]	語意		書寫	發音[.CG]	語意	分類
a.	m_yan	[məjan]	像	h.	myan	[mjan]	我們	（13d）
b.	b_yaring	[βəjariŋ]	虎頭蜂	i.	byacing	[βjatɕiŋ]	月亮	（13c）
c.	g_yagan	[ɣəjaɣan]	挑選	j.	gyahan	[ɣjaɦan]	開	（13d）
d.	hb_yaw	[ħəβəjaw]	趕、追逐	k.	hbyataw	[ħəβjataw]	用手拔	（13d）
e.	k_yaya’	[kəjajaʔ]	監視	l.	kyalun	[kjalun]	說	（13c）
f.	k_yuw	[kəjuw]	發麻	m.	kyut	[kjut]	折斷	（13d）
g.	s_yukun	[sɥjukun]	燒除獸毛	n.	syukun	[ɕjukun]	回應	（13d）

泰雅語因為同時具有音位性滑音及元音性滑音，CG 輔音串的發音問題比起一般輔音串來得複雜，含音位性滑音的 CG 不但可以分屬不同音節，也可以出現在同一個音節內。元音性滑音之前一定沒有 [ə]，需要以底線標示弱元音位置的均涉及到音位性滑音。

第二種方式是借助滑音符號的發音變體呈現 CG 的對比，而非直接「還原」被省略的 CG 間的弱元音。由於（14a–g）這一類需要標示弱元音位置的 CG 音串均含音位性滑音，而位於音節起始位置的音位性滑音 y /j/ 常有一個擦音變體 zy [ʑ]（H. Huang 2015a；見第 2.2 小節），如果將 y 改為 zy，例如（14d）hb_yaw [ħəβəjaw]「趕、追逐」寫為 hbzyaw [ħəβəʑaw]，便可表示 CG 之間有弱元音存在。對於傾向擦音化的語者而言，採用 zy 不僅可以與元音性滑音區分開來、而且較為接近實際語音，同時也可避免使用底線這一類非羅馬字的符號。然而，若採用 zy 僅是為了區分 CG 發音是否為同音節，對於沒有擦音化傾向的語者而言，反而是偏離了實際語音。

賽考利克泰雅語 y [j] ~ zy [ʑ] 的變異很大，不同地區或不同語者的滑音擦音化程度相當不一致，甚至同一位語者的發音也常有變異。[23] 以下舉例列出不同的書寫方式以及筆者所記錄的桃山泰雅語發音。這裡呈現被引用的原文的書寫方式，若原文沒有用底線來標示 y 與前面緊鄰輔音之間的弱元音，則未另加符號。擦音變體 zy [ʑ] 以灰底呈現。

[23] 賽考利克泰雅語聲母 y [j] 在 [ə] 的後面、比起在 i、u、a 之後，更容易變為 zy [ʑ]，這個變化的動機是透過滑音轉擦音來優化與前面音節尾音的響度差距（音節接觸法則；Syllable Contact Law, Murray & Vennemann 1983）。另一個優化音節接觸的方式是提高元音部分的響度，例如以下泰雅語聖經語料中，[ə] 在滑音 y 前面變為 [i]。

（15） 賽考利克泰雅語 y ~ zy 滑音擦音化的變異：[24]

	線上辭典	黃美金&吳新生（2018）	族語 E 樂園	泰雅爾語聖經（2022）	桃山泰雅語	語意
a.	m_yan	m_yan	miyan	miyan	mzyan	像
b.	m_yangi’	—	—	myangi	mzyangi’	久病
c.	hzyuci’	h_yuci’	hzyuci’	hyuci	hzyuci’	滑
d.	kmzyap ~ km_yap	kmzyap ~ km_yap	kmzyap ~ kmyap	kmiyap	kmzyap	抓
e.	mzyugi’ ~ m_yugi’ ~ myugi’	mzyugi’ ~ m_yugi’	mzyugi’ ~ mzyugi ~	myugi	mzyugi’ ~ m_yugi’ ~ miyugi’ ~ mizyugi’	跳舞
f.	hngzyang ~ hng_yang	—	hngzyang ~ hngyang	hngiyang	hngzyang	聲音
g.	qhzyang	qhzyang ~ qh_yang	qhzyang ~ qhyang	qhiyang	qhzyang	肩膀
h.	rhzyal	rhzyal	rhzyal ~ rhiyal ~ hiyal	hiyal	rhzyal ~ rh_yal	土地
i.	pzyux	pzyux	pzyux ~ piyux	piyux	pzyux	多
j.	mkzyay	mkzyay ~ mk_yay	mkzyay	mkiyay	mkzyay	乾
k.	mqnzyat mqnyat	mqnzyat	mqnzyat	qniyat	qngzyat	勤勞
l.	mzyup	mzyup	mzyup（~ myup）	miyup	mzyup	進入
m.	mshzyu’	mshzyu’	mshzyu’	mshiyu	mshzyu’	直
n.	mtzyu’	mtzyu’	mtzyu’	tzyu	mtzyu’ ~ mt_yu’	六

[24] 黃美金、吳新生（2018）語料出處分別為頁碼：（a）22、（c）264、（d）273、（e）267、（g）268、（h）65、（i）268、（j）266、（k）266、（l）267、（m）266、（n）267。族語 E 樂園語料出處分別為：（a）學習詞表–代名詞/指示詞（寫為 miyan 但音檔為 [mə**z**aŋ]、（c、j、k、m）學習詞表–特徵、（d）學習詞表–肢體動作、族語短文–家人與故鄉、（e）學習詞表–肢體動作、新九階教材第三階第六課、（f）學習詞表–其他、生活會話篇 24、（g）學習詞表–身體部位、主題式掛圖–身體部位篇、（h）新九階教材–第 5 階第 1 課、族語短文–交通工具、族語短文–學校生活–互動句型練習、（i）新九階教材第七階第三課、族語短文–訪談用語–互動句型練習、（l）學習詞表–行動、閱讀書寫篇 15（寫為 myup 但是音檔唸為 mzyup）、（n）學習詞表–數字計量（音檔裡的擦音化程度較弱）。泰雅爾語聖經（2022）語料出處分別為：（a）馬太 9–33、（b）馬太 9–20、（c）創世紀 27–11、（d）馬太 13–41、（e）馬太 14–6、（f）馬太 2–18、（g）馬太 23–4、（h）馬太 2–6、（i）馬太 20–10、（j）馬太 13–6、（k）約翰 6–27、（l）馬太 2–11、（m）路加 13–11、（n）馬太 17–1。

在原民會線上辭典、黃美金、吳新生（2018）、及族語 E 樂園網站中可以看到許多 z ~ zy 的變異；個別詞彙擦音化的傾向略有差異，例如「像」一詞的 y 傾向維持滑音、「直」大多數含擦音變體[25]，顯示濁擦音可能逐漸發展出區辨功能。整體而言，桃山泰雅語含擦音變體較多，而泰雅語聖經當中的擦音變體較少。在泰雅語聖經中，許多音位性滑音 y 前面的 [ə] 已轉變為 [i]，因此不再有書寫符號輔音串。也就是說，滑音轉擦音規律、與 [ə] 變為 [i] 規律，均會使得原本 CG 發音的對比移轉至鄰近的滑音或元音。因此，含 y 的 CG 發音對比由以下三種方式呈現：（1）底線、（2）zy 變體、（3）iy。常見的例詞之一為黃美金、吳新生（2018: 21）的 myan [mjan]「我們」及 m_yan [məjan]「像」、桃山泰雅語 myan「我們」和 mzyan「像」、以及泰雅語聖經的 myan「我們」和 miyan「像」。

在（15）的語料中，值得注意的另一點是雖然泰雅語聖經裡許多倒數第二音節的 [ə] 在 y 之前變化為 [i][26]，倒數第三音節的 [ə] 在（b）myangi、（c）hyuci 及（m）myugi 等詞彙並未改變（比較：馬太 3–03，psh**i**yuwiy「修直（祈使）」倒數第三的 [i]）；因此在這個環境的書寫符號 CG 輔音串仍有兩種不同發音沒有以書寫符號區分開來。

CG 輔音串的發音問題也出現在含 w 的詞彙，例如桃山泰雅語 [ħəwakan]「攙扶（處焦）」不同於含元音性滑音的 [ħwaħun]「毀壞（受焦）」，[27] 不過含音位性滑音 Cw 的詞彙明顯比 Cy 少了許多。黃美金、吳新生（2018: 264）使用底線標示 [ə] 的位置，例如 h_winuk [ħəwinuk]「腰」。[28] 在擦音化明顯的桃山泰雅語，w 的擦音變體可出現在某些詞彙，例如「將裝載」在線上辭典的音檔為 [pəwariŋ]，而桃山泰雅語為 [pəwariŋ] ~ [pəɣwariŋ]/[pəɣʷariŋ]，後者可寫為 pgwaring。整體而言，比起 z 變為 zy，w 擦音化為 gw 的情況不常見，因此若希望以擦音變體 gw 來間接表示 Cw 的中間有 [ə]，較難成為一個通則。[29]

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25 筆者於新竹縣尖石鄉新樂村亦記錄到含滑音的 [məsɻħəjuʔ]「直」。

26 泰雅語聖經仍可找到一些倒數第二音節的 [ə] 在 y 之前沒有變化為 [i] 的詞彙，例如「換」的相關詞 mt'yuw（羅馬書 8–20）、pt'yuw（詩篇 148–6）；比較線上辭典 'iyuw「更換」、黃美金、吳新生（2018: 267）m'iyuw。另外，關於 y 之前 [ə]/[ɿ] ~ [i] 的變異，亦見於線上辭典 qszyu' [qəsɻzuʔ]「杵」（在 mtlubuw 的例句內）及 Li（1981: 249）qsizuʔ。

27 錢玉章（2001: 107）使用橫線來標示輔音串間的弱元音，記為 h-wakun，與 hwahun 形成對比。

28 但是底線也常被遺漏，例如線上辭典 hwinuk [ħəwinuk]、kwagi [kəwaɣi] ~ kgwagi「打掃（祈使非主焦）」、kwagiq [kəwaɣiq]「高（前綴 k-）」，及族語 E 樂園 h_winuk ~ hwinuk。

29 在線上辭典及族語 E 樂園中，「高」的相關詞彙有些含擦音化的寫法 gw，例如線上辭典 kgwagiq、pkgwagiq，族語 E 樂園 kgwagiq（句型篇高中版基本詞彙–事件 [動詞]–否定句時的動詞形式），但是相關音檔的擦音部分不存在、或是很微弱。泰雅語聖經寫為不含擦音的 pkwagiq（馬太 20–31）。

以上的討論顯示，CG 輔音串的發音之所以產生不同的處理方式，主要是因為各地區的方言發音原本就不盡相同。以帶音位性的 y 滑音為例，Cy 可能對應至 [Cə.j]、[Cə.ʑ]、或 [Ci.y]。在此情形下，如果希望書寫符號反映語音，就一定會產生書寫形式的歧異；如果書寫一致，則是無法兼顧不同地區的發音。

3.4 雙字母組合 ng 及 zy

在上述的討論中，zy 和 ng 都被視為雙字母組合，兩個字母代表一個音，分別為濁擦音 [ʑ] 及舌根鼻音 [ŋ]，文獻上較常討論的是 ng。ng 的預設發音是 [ŋ]，若 ng 表示兩個語音則以附加符號分開，例如「逐漸」寫為 n_gyut [nə.ɣjut]（黃美金、吳新生 2018: 9；族語 E 樂園閱讀書寫篇 4）或 n-gyut（族語 E 樂園生活會話 19）。不論是採用底線 n_g 或橫線 n-g，問題在於須區分兩種發音，一是含弱元音的 [nə.ɣ]、另一個是中間無弱元音但是音段分屬兩個音節的 [n.ɣ]。與 CG 輔音串相比，ng 輔音串的發音僅對應至 CG 輔音串的其中兩種，（13a）Cə.G 及（13b）C.G，因為輔音串發音的 ng 不像 CG 可以出現在音節的起始位置。目前所看到的書寫方式均未區分 [nə.ɣ] 及 [n.ɣ]，如下所示。

（16） ng 輔音串的兩種發音方式

	線上辭典	泰雅爾語聖經（2022）	發音	中文
a.	**n_g**yut	**n-g**yut（馬太 24–12） m**n-g**yut（創世紀 8–05）	[**nə.ɣ**jut] [mə.**nə.ɣ**jut]	逐漸
b.	**n_g**on	**n-g**on（使徒行傳 22–16）	[**nə.ɣ**on]	等（受焦）
c.	mi**n_g**luw	mi**n-g**luw（馬太 26–69）	[mi**n.ɣ**ə.luw]	同夥
d.	ki**n_g**iwan[30]	ki**n-g**iwan（路加 18–07）	[ki**n.ɣ**i.wan]	代理

（16）當中的底線（或橫線）符號各有兩個功能：標示輔音串之間被省略的弱元音（16a–b）、或是僅代表音節界線（16c–d）。一個符號被賦予多個意義較為複雜，但是由於含中綴 <in> 的形式裡（<in>g），ng 部分一定是唸為 [n.ɣ] 而非 [nə.ɣ]，可以以此為依據將兩種發音區分開來：不含中綴 <in> 的（16a–b）唸 [nə.ɣ]，含中綴的（16c–d）唸 [n.ɣ]。[31] 至於書寫符號選擇用底線或橫線來表示 ng 之間的弱元音，與方言內部音韻規律無關，純粹是符號選擇的問題。

[30] 目前辭典寫為 kingiwan。這裡為了一致性將其改為 kin_giwan。

[31] 詞根較短的形式有不同的形態，另見第 6 節的討論。

目前為止的討論均將 zy 視為雙字母組合，代表舌面濁擦音 [ʑ]；另一個未探討的可能性是 zy 代表兩個音段 [zj]，來自於底層 /zj/ 當中的 /z/ 在 /j/ 之前經歷顎化規律的結果（/z/ → [ʑ] / __ {i, j}）。有趣的是，若假設 zy 代表兩個音段，z 和 y 僅能處於同一音節內起始位置的 [.zj]（對應至（13c）），而不像 CG 或 ng 輔音串可對應至異音節的 [zə.j] 或 [z.j]。即使是在因為詞首閉音節形成規律而允許韻尾輔音 z 的桃山泰雅語，zy 亦一定屬於同一個音節。這一點也凸顯了 [z]/[ʑ] 在泰雅語音韻分布的侷限性，應將 zy 分析為單個語音 [ʑ] 而非 [zj]。

4. 詞幹尾音段的轉換

賽考利克泰雅語詞幹結尾 （stem-final）音段的轉換，包括滑音強化為擦音（H. Huang 2020）、以及擦音弱化為滑音（Li 1980）兩個截然不同的面象。詞幹尾滑音變擦音發生在加後綴形式，指的是 y 在 i 之前變為 z、以及 w 在 u 之前變為 g [ɣ]，例如語料（17）。滑音強化為擦音所造成的書寫不一致情形較少，因為是明確的語音改變，只需置換為擦音符號；若是沒有語音轉換也就沒有符號的改變。雖然滑音變為擦音之後有別於基底型式裡的 y、w，但是由於語音差距大，寫為反映口語擦音的 z、g 符號是相當自然的選擇。以下是詞幹尾滑音變為擦音的例詞。

（17） 詞幹結尾的滑音 y、w 在聲母位置強化為擦音 z、g [ɣ]（線上辭典語料）

	書寫	滑音在詞尾		書寫	滑音在聲母位置變化		詞根語意
a.	thay	/tɦaj/	[təɦaj]	thazi	/tɦaj-i/	[təɦaʑi]	保留
				thayan	/tɦaj-an/	[təɦajan]	
b.	phapuy	/pɦapuj/	[pəɦapuj]	phpuzi	/pɦapuj-i/	[pəɦəpuʑi]	煮
				phpuyan	/pɦapuj-an/	[pəɦəpujan]	
c.	sosaw	/sosaw/	[sosaw]	ssagun	/sosaw-un/	[sʅsaɣun]	驅趕
				ssawi	/sosaw-i/	[sʅsawi]	

另一方面，賽考利克泰雅語詞尾弱化（或柔化）的音韻規律使得在詞尾位置的 g /ɣ/轉為滑音 w（亦見（5i）之方言差異），造成 g [ɣ]~w 在同一個詞彙的不同構詞形式裡產生交替。由（17）和（18）語料的對比，可以推知這兩組語料的性質不同。若是詞幹以 /w/ 結尾，只有在加上 -un 時才會變為 g [ɣ]（17c）；但若是詞幹以 /ɣ/ 結尾，則所有加後綴形式均會保留原本的濁擦音（18）。滑音 w 強化為 g [ɣ] 以及濁擦音 g /ɣ/ 弱化為 w，雖然

從書寫符號的角度而言都是牽涉到 w 和 g，它們其實是兩條變化方向相反的音韻規律共存於同一個音韻體系內，使音節趨近於「起始響度低、結尾響度高」的理想形態。

（18） 詞幹結尾的濁擦音在詞尾弱化為滑音（線上辭典語料）[32]

	書寫	濁擦音在詞尾變化		書寫	濁擦音在聲母位置		詞根語意
a.	htuw	/ħtVɣ/[33]	[ħətuw]	htgan	/ħtVɣ-an/	[ħətəɣan]	出現
				phtgi	/p-ħtVɣ-i/	[pəħətəɣi]	使出現
b.	bkuw	/βkVɣ/	[βəkuw]	bkgan	/βkVɣ-an/	[βəkəɣan]	排列
				bkgun	/βkVɣ-un/	[βəkəɣun]	
				bkgi	/βkVɣ-i/	[βəkəɣi]	
c.	hlngaw	/ħlŋaɣ/	[ħələŋaw]	hlngagan	/ħlŋaɣ-an/	[ħələŋaɣan]	加溫加熱
				hlngagun	/ħlŋaɣ-un/	[ħələŋaɣun]	
				hlngagi	/ħlŋaɣ-i/	[ħələŋaɣi]	

除了 g /ɣ/ 變為 [w] 的詞尾弱化現象，另有 /r/ 在詞尾位置變為 y [j]的規律，相關例詞如下。

（19） 詞幹結尾的 /r/ 在詞尾弱化為滑音 y（Li 1980: 360；線上辭典）

	書寫	/r/ 在詞尾變化		書寫	/r/ 在聲母位置		詞根語意
a.	kgiy	/kɣir/	[kəɣij]	kingiran	/k<in>ɣir-an/	[kinɣir-an]	刮苧麻
b.	pgyay	/pɣjar/	[pəɣjaj]	pgyaran	/pɣjar-an/	[pəɣjaran]	離開
				pgyari	/pɣjar-i/	[pəɣjari]	

詞尾 g /ɣ/ 變為 w、及 r 變為 y，與如何書寫賽考利克泰雅語尾音的議題息息相關。詞尾弱化音韻規律是建立在以下這個假設上：在未加後綴形式中，尾音變為滑音、並未直接丟失。因此，（18a）htuw 不寫成 htu，而（19a）kgiy 不寫成 kgi。以 uw、iy 來書寫在構詞音韻變化當中 w/y 與輔音 g/r 產生交替現象的詞彙，是目前最為常見的書寫方式，例如黃美金、吳新生（2018）、泰雅爾語聖經（2022）、達少・瓦旦（2019）等。在線上辭典及族語 E 樂園網站則有程度不等的尾音丟失的書寫方式，例如（18a–b）及（19a）三個例詞，在線上辭典目前分別寫為 htuw、bkuw、kgiy ~ kgi，而族語 E 樂園網站則有 htuw、bkuw、kgiy ~ kgi（補充教材–學習詞表–織布服飾；mkgi，四套教材–歌謠篇 10）。

32 更多 g~w 相關語料請見 Li（1980: 358–359）。

33 這裡在底層形式大寫的 V，對應至原始泰雅語的央中元音 *ə。詞幹尾音節內的 V 對應至 [ə]~[u] 的元音交替（H. Huang 2018），例如（18a）。

如果尾音的變化牽涉到（17–19）這類的轉換，建議將尾音的滑音寫出，以反映上述的詞尾弱化規律。若是不寫出，例如 kgi、htu，則暗示詞尾元音只是一般的長度，詞尾弱化規律已完全變化為詞尾輔音丟失規律了。

因此，在釐清 uw、iy 書寫方式的討論中，可以考量相關構詞形式和詞類差異。以下以 iy 結尾的詞為例：

（20） 詞尾音段的書寫對比（括號中的形式較不常出現）[34]

	線上辭典	聖經（2022）	族語 E 樂園	詞意
a.	mbazi**y** bzi**r**an	mbazi**y** bzi**r**an	mbaziy（~ mbazi）	買（主焦） 買（處焦）；商店、市集
b.	tuqi**y**（~ tuqi） sintq**y**an	tuqi**y** sintq**y**an	tuqiy（~ tuqi）	路 修築道路
c.	thazi’	thazi		挑釁
d.	thazi	thazi**y**		保留（後綴 -i：祈使句受焦）
e.	qani	qani**y**	qani ~ qaniy	這

以上（20a–e）五種詞彙，最容易產生爭議的是（20b）和（20e）。（b）雖然有加後綴形式可以比對，但是卻又不像（20a）有 r~y 不同音段的轉換，因此詞尾的滑音符號常被省略。至於（e），則是沒有加後綴形式作為參考。正如第 2.1 小節所述，泰雅語聖經是採用二分法，僅區分 iy 及 i 結尾。[35] 黃美金、吳新生（2018）（及線上辭典）則是三分法，將加了後綴 -i 的形式及 qani（20d–e）與其他的實詞區分開來，以元音 i 結尾的書寫方式僅限於後綴 -i 形式（反映了原始南島語的後綴 *-i，Ross 2009）、以及少數功能詞，例如（20e）qani 和 siki「必須」（黃美金、吳新生 2018: 281）、siki ~ si ki（線上辭典）。[36] 詞尾的書寫分為兩類或三類並無優劣之分，主要是方言內部尾音長短及喉塞音強弱的差異不容易兼顧。

[34] 泰雅爾語聖經（2022）部分的語料分別來自於：mbaziy 哥林多前書 6–20、bziran 馬可 6–56、tuqiy 馬太 2–12、sintqyan 詩篇 5–08、thazi 耶利米書 18–18、thaziy 使徒行傳 20–20、及 qaniy 馬太 1–22。族語 E 樂園的語料可參見：mbaziy 補充教材–學習詞表–行動、mbazi 四套教材–文化篇 25、tuqiy 基礎教材–新九階教材–第 5 階第 8 課、tuqi 補充教材–學習詞表–山川地理、qani 基礎教材–句型篇國中版–看圖識字–身體部位、qaniy 基礎教材–新九階教材–第 7 階第 3 課。黃美金、吳新生（2018）的語料因空間限制未能列入，語詞與線上辭典一欄相同，僅有以下兩個差異：（1）（20b）一律寫為 tuqiy；（2）書中未含 sintqyan 這個加綴形式。

[35] 泰雅語聖經裡沒有 i’ 或 u’ 結尾的詞彙，但是以元音 [a] 結尾的詞彙中，喉塞音的有無具有區別性，例如 na’「還」（馬太 7–11）及 na（屬格；馬太 1–1）。

[36] 在泰雅語聖經中寫為 siy ki（馬太 5–16）。語尾助詞 ki（黃美金、吳新生 2018: 259）在泰雅語聖經中為 kiy（馬太 5–18）。其他像是 ki「和（伴同格）」以及 ni（屬格），在各個參考資料的書寫方式相當一致。

5. 喉塞音相關議題

第 2.5 小節曾提到四季、澤敖利、及宜蘭澤敖利泰雅語的詞尾喉塞音呈現弱化或消失，其實在賽考利克泰雅語內部，詞尾喉塞音的強弱也有地區性的差異。喉塞音發音明顯的語者傾向將其標示出來。以 thazi’「挑釁」（20c）為例，因為標示了詞尾喉塞音，便可以與（20d）/tħaj-i/ [təħazi] thazi「保留（祈使、受焦）」不帶喉塞音結尾的加後綴形式區分開來，不需另外使用詞尾滑音符號。若是詞尾喉塞音發音微弱或甚至消失，便僅能以是否有詞尾 y/w 來捕捉尾音長短的差異。

詞中位置的喉塞音在泰雅語很常見，尤其是鄰近 /i u a/ 等週邊元音，例如 ki’an「在、有（處所焦點）」、qhya’an「口渴（處所焦點）」、hswa’un「如何（受事焦點）」（線上辭典）。若是緊鄰弱元音 [ə]，許多詞彙也保有喉塞音，例如 k’man [kəʔəman]「草」、b’nux [βəʔənux]「平原、平坦」、ptl’nux [pətələʔənux]「平原、平坦」。然而，有些詞彙的詞中喉塞音會丟失，試比較第 3.1 節桃山泰雅語 sr’zyut [sər.ʔə.ʐut] 及線上辭典 srzyut [sə.rə.ʐyt]「整理（祈使）」（6u）的差異，顯示詞中位置的喉塞音在弱元音之間消失了。這一類的喉塞音丟失並不會造成書寫方面的困擾，因為只牽涉到單個語音的存在與否，不同的書寫方式僅僅反映了不同地區或不同語者的發音差別。

詞首位置的喉塞音，在書寫方面需要特別說明。因為泰雅語並沒有元音起始（vowel-initial）及喉塞音起始的對比，因此不標出詞首位置的喉塞音是較為簡潔的作法，例如 agal [ʔaɣal]「拿（祈使）」、utux [ʔutux]「神、靈、鬼、魂」、ima’ [ʔimaʔ]。當這一類看似元音起始的詞彙加上前綴之後，原先的詞首喉塞音變成在詞中位置，因此原來被省略的詞首喉塞音在加前綴形式時便會出現，例如 agal 的構詞相關形式有 p’agal /p-ʔaɣal/ [pəʔaɣal]「將拿」及 s’agal /s-ʔaɣal/ [sɻʔaɣal]「拿（周邊焦點）」。另外一種情況是，當詞首喉塞音後面緊接 [ə]，若同時省略詞首喉塞音及弱元音，會產生一整個詞首音節 [ʔə] 被略去的發音混淆；因此，當詞彙以 [ʔə] 開頭時，詞首喉塞音符號不能省略，例如 ’bagan [ʔəβaɣan]「夏天」、’pux [ʔəpux]「壓住」、’zil [ʔəʐil]「左」（線上辭典）。書寫形式裡這一類的詞首撇號（’），後面均緊鄰輔音符號。

值得注意的是，以喉塞音起始的詞幹加上重疊前綴，會產生 [ʔə.ʔ] 的發音，例如 utux [ʔutux]「神、靈、鬼」的重疊式 [ʔəʔutux]。若根據上述原則，[ʔəʔutux] 應寫成含兩個撇號的 ’’utux：詞首喉塞音因為後面緊接弱元音所以不省略、詞中喉塞音如實寫出。然而，目前較為常見的寫法為 ’utux [ʔəʔutux]（馬太 4–24）。關於這類少數以一個撇號

起始並且後接元音符號的詞彙，使用者在發音時將詞首的撇號對應至整個音節 [ʔə] 而非僅是喉塞音 [ʔ]，並且將後面的 utux 詮釋為一般書寫時以元音開頭的詞彙、因此在發音時會補上一個「詞首」（其實是詞中）喉塞音。（21）以圖顯示 ’utux 的特殊書寫方式和實際發音 [ʔəʔutux] 之間的對應關係，與一般的書寫原則對應關係不同。

（21） 重疊式裡的詞首喉塞音及弱元音 [ʔə.ʔ]

a. 單詞　　b. 重疊形式

utux　　’’utux　　一般原則：撇號對應至喉塞音[ʔ]、省略輔音間的弱元音、省略詞首撇號（但是以[ʔə]發音開頭時不省略詞首撇號）

[ʔutux]　　[ʔə ʔutux]

utux　　’utux

特殊做法：將撇號詮釋為[ʔə]、將其後元音起始的詞幹詮釋為單詞

泰雅語的這個例子，凸顯了書寫慣例偶而會導致符號與語音之間的對應不完全一致的情形。喉塞音 [ʔ] 的發音沒有顯著的聽感，在教學時常須搭配弱元音唸出、發成 [ʔə]，因此撇號容易被重新詮釋為一個音節（[ʔə]）。

6. 中綴 <in> 及輔音增生

賽考利克泰雅語含完成貌中綴 <in> 的構詞形式常出現不同的書寫方式。音韻規律導致 <in> 依據環境的不同，會出現 [in]、[ən]、或 [in.n] 三種發音。當元音弱化影響了 /in/，便會出現 [ən] 的形式，其中的 [ə] 與 [n] 分屬不同音節，對應至書寫符號單個輔音，例如 mnwah [mə.nwaɦ]「來過」。在以下（22）的語料中，對應至中綴 <in> 的書寫符號以粗體表示，它的語音體現以底線標示出來，灰底則是標示增生的輔音。

（22） 中綴 <in> 形式的輔音增生及其對應的書寫符號[37]

	線上辭典	黃美金&吳新生（2018）	族語 E 樂園	泰雅爾語聖經（2022）	語意（詞根）
a.	m**in**kahul [min.ka.ħul]	m**in**kahul [min.ka.ħul]	m**in**kahul [min.ka.ħul]	m**in**kahul [min.ka.ħul]	從、來自
b.	m**in**aniq [min.na.niq]	m**in**aniq [min.na.niq]	m**in**naniq [min.na.niq]	m**in**naniq [min.na.niq]	吃
c.	m**in**aki’ [min.na.kiʔ]		m**in**naki [min.na.ki]	m**in**naki [min.na.ki]	在、有
d.	m**n**wah [mə.nwaħ]	m**n**wah [mə.nwaħ]	m**n**wah [mə.nwaħ]	m**in**nwah [min.nwaħ]	來
e.		b**in**ka’ [βin.nə.kaʔ]			打破
f.			l**in**npuw [lin.nə.puw]	l**in**npuw [lin.nə.puw]	讀
比較：					
g.		m**in**nbu’ [min.nə.βuʔ]			生病
h.	m**in**nbu [min.nə.βu]			m**in**nbuw [min.nə.βuw]	喝

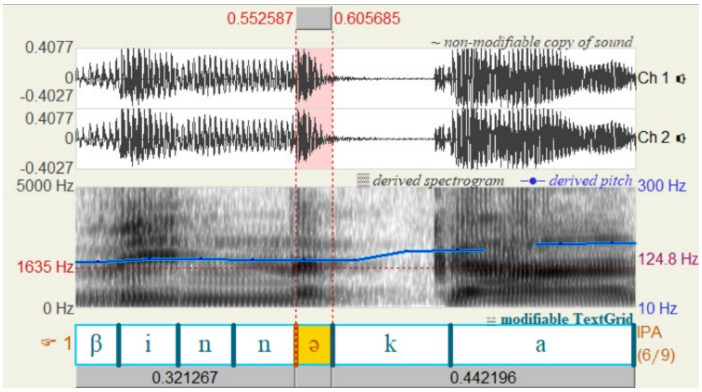
當中綴 <in> 後接輔音時，[in] 的發音形成音節的韻核及韻尾，右緣與音節的界線對齊，例如（22a）minkahul；這是最為單純的情形，在各來源的書寫形式完全一致。然而，當中綴 <in> 後接元音，由於泰雅語的音節均須以聲母輔音起始，中綴 <in> 的 [n] 在發音上便會同時隸屬於前面音節的韻尾及後面音節的聲母，例如（22b）[min.na.niq] 及（22c）[min.na.ki(ʔ)]，產生這裡所稱的輔音增生現象。如果中綴 <in> 後面緊接的滑音屬於元音性質，例如（22d）[min.nwaħ] 當中的 w，同樣有輔音增生的情形。（22e–f）是一個較為特別的組成，其形態特徵是含有一個緊接在 <in> 之後的弱元音。弱元音亦是元音的一種，因此當弱元音在 <in> 之後，輔音增生也會如預期產生，例如三音節的（22e）[βin.nə.kaʔ]，未加中綴的相關形式為 bka’ [βəkaʔ]「破掉」。[38] 相關音檔顯示 <in> 之後的弱元音確實存在，如以下（23）所示。然而，（22e）的書寫方式 b**in**ka’ 省略了弱元

[37] 語料來源如下。黃美金、吳新生（2018）：（a）第 168 頁，（b）第 154 頁，（d）第 172 頁，（e）第 103 頁，（g）第 109 頁。族語 E 樂園：（a）基礎教材–新九階教材–第 2 階第 5 課，（b）補充教材–族語短文–交通工具，（c）四套教材–文化篇–8、（d）補充教材–學習詞表–行動，（f）基礎教材–新九階教材–第 8 階第 5 課。泰雅爾語聖經（2022）：（a）馬可 1–05，（b）創世紀 27–04，（c）創世紀 14–04，（d）創世紀 19–05，（f）馬太 21–42，（h）創世紀 9–21。

[38] （22e）正確發音為三個音節，顯示基底型式應將詞根分析為含倒數第二音節弱元音。

音，也未將增生的 n 寫出，會被誤解為唸成兩個音節（*[βin.kaʔ]）。（22g–h）是為了說明與其他例子的對比。雖然書寫符號含兩個 n，但僅是因為詞幹 nbu’「生病」、nbuw「喝」原本就以 n 起始，因此在 <in> 的形式有兩個 n 的並列，並不牽涉到輔音增生現象。

（23） [βin.nə.ka(ʔ)]當中增生的 n 與其後的弱元音 [39]



關於含有增生輔音後接弱元音的詞彙（22e–f），增生輔音與弱元音必須擇一標示，否則書寫形式與發音之間會有一整個音節的落差。反映正確發音的方法有兩種，一是採用（22）所呈現的族語 E 樂園與聖經的做法，將發音時增加的輔音 n 寫出。另一個作法是黃美金、吳新生（2018）及線上辭典裡的底線，以底線標示弱元音位置，例如將 binka’ 寫為 bin_ka’。

一般常見的書寫原則不會將增生的 n 寫出，原因是增生的語音純粹是發音的考量，在詞素語意分析上只有 in 兩個音段、而非三個。黃美金、吳新生（2018）以及線上辭典依循詞素分析的考量，一律未寫出增生的輔音。比起含兩個 n 的 m**in**naki，[40] 寫成 m**in**aki 的優點是直接反映了未加 <in> 的相關詞彙為 maki，這樣一來便可以與（22g–h）這一類在詞素分析上真正含有兩個 n 的情況區分開來。另外，在泰雅語的許多詞彙裡，不寫出增生的輔音並不會衍生發音問題；例如，讀者只須知道中綴 [in] 的右緣須對齊音節界線、以及音節須有聲母兩個原則，便知道（22b）m**in**aniq 應唸為 [min.na.niq]。

[39] 黃美金、吳新生（2018）一書的音檔網址為 http://ilrdc.tw/grammar/。binka’ 一詞在第六章焦點與時貌語氣系統（6–41）例句內，雖然目前網頁所呈現的文字有誤，但是音檔編號的對應是正確的。

[40] 這裡的討論暫不考慮 maki’ ~ maki「在、有」詞尾喉塞音的變異。

然而，以底線標出弱元音（bin_ka’）的缺點是可能衍生出此處的底線被詮釋為弱元音或是音節界線的問題（請見第 3.4 節關於 n_g 的討論）。假設有類似 bin_ka’ 形態的詞彙、但是最後音節的聲母是 g，便無法從書寫方式判斷此處的 n_g 是為正確的發音 [nə.ɣ] 或錯誤的 [n.ɣ]。

簡而言之，賽考利克泰雅語含中綴 <in> 的發音，即使在無明顯發音差異的情況下，書寫形式卻常有出入，主要是因為同時有 <in> 所誘發的輔音增生、以及省略弱元音的原則；書寫時依循詞素分析或者實際發音，便產生了不同的書寫方式。

7. 結語

本文整理關於泰雅語書寫方式的幾個重要議題，討論它們背後所蘊含的音韻規律及現象，包括元音弱化與刪除、滑音強化、詞尾音段轉換及尾音長短差異、音位性滑音與元音性滑音所導致的 CG 不同發音、詞尾喉塞音弱化，以及因為構詞加綴而產生的輔音增生等現象。

賽考利克泰雅語常見的書寫形式差異，依本文討論大致可歸為兩類。第一種是方言內部原本就有地區性發音差異。如果須使用相同的書寫形式，就不可避免地與語音有所出入，例如（24）所列出的現象。第二種則是發音並無歧異，導因於書寫原則考量的重點不同，像是較為貼近發音、或是反映詞根詞綴原始的樣貌，例如（25）所呈現。

（24） 書寫差異源自方言內部發音差異

	地區性發音差異的現象	概略說明
a.	重音前的弱元音是否刪除	桃山：傾向刪除第二個弱元音 環山：傾向刪除清擦音之後的弱元音
b.	y [j] 是否強化為 zy [ʑ]	桃山：y 強化為 zy 的傾向較明顯
c.	詞尾喉塞音是否保留	桃山、尖石：傾向保留詞尾喉塞音
d.	單元音化：ay/ai 變為 e、aw/au 變為 o	桃山：維持 ay、aw（參考第 2.4 節）
e.	i/u 在/q ħ/旁變為中元音 e/o	桃山：維持高元音（第 2.4 及 2.5 節）
f.	含高元音結尾的詞是否有尾音長短差別	較年輕語者可能差異不明顯

比起線上辭典尖石泰雅語的語料，桃山及環山泰雅語弱元音分布的規律較複雜。但是由於這兩個次方言弱元音發音變異仍多，重疊結構、語速、及個人因素均會影響實際發音

裡弱元音的強弱有無，因此筆者認為仍可以預設弱元音省略不寫（24a），另外個別說明哪個輔音之後不發出弱元音（例如第二個輔音、或清擦音之後等）即可。至於（24b–e），由於使用時轉換書寫符號相對容易，書寫差異反映不同地區的發音不致於造成太多困擾。關於（24f）尾音長短差別，含詞尾滑音與擦音轉換的詞彙建議仍寫出尾音 y、w，在詞尾喉塞音明顯的方言呈現三分法（即黃美金、吳新生 2018：kgiy、tuqiy、laqi’、laxi）。

由重疊形式衍生的詞首發音 [ʔə.ʔ] 引發了一些特殊的書寫議題。詞首喉塞音省略及弱元音省略原本是兩個獨立的書寫原則，但是同時遵循這兩個原則會導致這種形態的詞彙一整個詞首音節 [ʔə] 未寫出，因為相鄰的兩個音均被省略。由於喉塞音聽感不顯著的特質，部分書寫形式將撇號（’）詮釋為 [ʔə] 而非單個輔音 [ʔ]，發展出不同的書寫符號與語音對應關係。

在假設弱元音省略不寫的前提下，容易產生發音誤解的語詞則須標示弱元音的位置；但是以哪種方式仍需要一些共識。表示弱元音位置的方式，除了以附加符號（例如底線或其他符號）直接標示元音所在，亦可透過相鄰的輔音，例如 zy（第 3.3 小節）、或增生的輔音 n（第六節）來表示含弱元音的那個音節。

（25） 其它待形成共識的書寫議題及相關發音規律

	書寫議題	**線上辭典；黃&吳（2018）**	**泰雅爾語聖經（2022）**
a.	ng：發音為 [ŋ] 或 [nə.ɣ]。預設發音為 [ŋ]，[nə.ɣ] 則需另外標示弱元音	n_gyut [nə.ɣ] 寫為 n_g	n-gyut [nə.ɣ] 寫為 n-g
b.	中綴 <in> 後接 g：<in> g 的發音為 [in.ɣ] 而非 *[iŋ] 或 *[i.ŋ]	min_gluw [in.ɣ] 寫為 in_g	min-gluw [in.ɣ] 寫為 in-g
c.	中綴 <in> 後接一般元音：<in> 的發音為 [in.n]	m**in**aniq [min.na.niq] 反映詞素基本型式	m**in**naniq [min.na.niq] 反映實際語音
d.	中綴 <in> 後接弱元音唸為 [in.nə]，須寫出 n 或還原弱元音位置，否則書寫形式將丟失一個音節	（標出弱元音位置，binka’[βin.nə.kaʔ] 修改為 bin_ka’）	**lin**npuw [lin.nə.puw] 寫出增生的輔音 n

當中綴 <in> 其後緊接弱元音，若是省略弱元音、也不寫出增生輔音，同樣會產生整個音節消失的問題。假設以底線代表弱元音，如果要反映 [βin.nə.kaʔ] 這一類詞的正確發音，最容易的方式是標示弱元音所在，將 binka’ 修改為 bin_ka’。採用此方式，應同時將底線

符號表示音節界線的功能移除，依聖經的方式寫為 min-gluw [min.ɣə.luw] 而非 min_gluw，以避免 min_gluw 的寫法被誤解為 <in> 之後含弱元音（*[min.nə.ɣə.luw]）。此一書寫方式在（25）以灰底呈現：（1）預設 ng 為 [ŋ]、CG 為同音節，弱元音省略不寫；（2）n 與 g、C 與 G 之間若有弱元音以底線還原；（3）中綴 <in> 增生的輔音 n 不重複寫出；（4）中綴 <in> 後接弱元音時亦以底線標出弱元音所在位置；（4）含中綴的 <in>g 以橫線隔開 n 與 g 兩個音。希望本文的討論有助於閱讀書面資料的學習者能夠自由切換於不同的書寫方式間，也或可作為族人進一步討論書寫規則的參考。

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Unveiling phonological rules in Atayal writing symbols

This article expounds on the correspondences between Atayal writing symbols and phonetics, with a focus on the inconsistencies in current writing. It further explores the phonological rules involved in these issues, including the reduction and deletion of vowels, glide strengthening and fricative weakening as shown by the alternations of stem-final segments, the omission and weakening of glottal stops, and the pronunciation of words containing the infix <in>. It is hoped that the article will be helpful to readers who are interested in discussing writing principles and those who seek to understand the phonetic profile of Atayal through written materials.

Keywords: schwa, glottal stop, glide strengthening, glide-fricative alternation, vowel deletion, consonant gemination

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A phonology of Yongxing: An Ong-Be variety of northwestern Hainan

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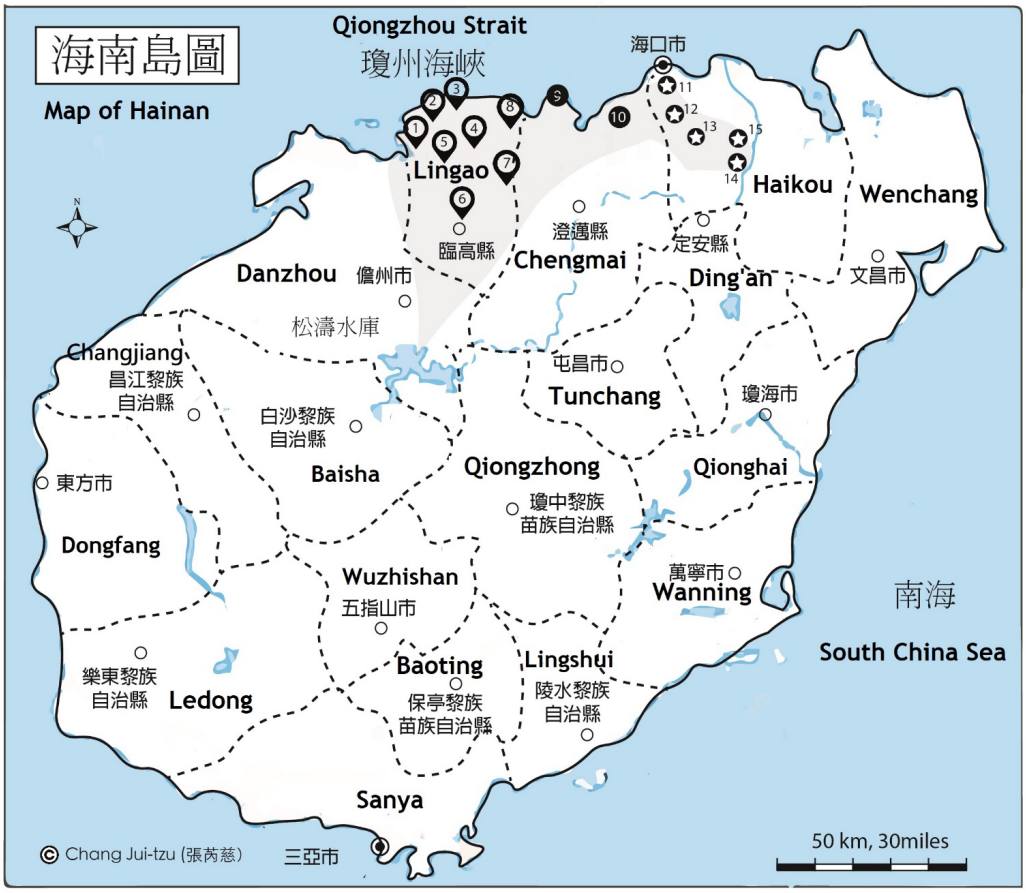
Yongxing is an under-described Ong-Be variety spoken in northwestern Hainan Province. This article provides a phonological description of Yongxing, where both segmental and tonal systems are explored, and adds new data to the study of tonal behavior. This paper reveals that tones in Yongxing undergo optional tone alternation and neutralization in non-phrase-final position and that such tonal phenomena are not always sensitive to phrasal structures. The phonological characteristics of Yongxing are also discussed in the context of the Kra-Dai family of languages as a whole.

Keywords: Ong-Be, Hainan, Kra-Dai, Positional Tone Sandhi, Tone Alternation, Neutralization

1. Background

This paper is an attempt to present a phonological overview of Yongxing, a fully-tonal Kra-Dai variety spoken in Haikou City (海口市), the capital of Hainan Province (海南省) in the People's Republic of China (see #13 on Map 1). By "fully-tonal" we mean that every syllable has phonologically contrastive pitch. Due to space constraints, this study can only focus on the lexical tones of the native Kra-Dai stratum of colloquial Yongxing. Grammatical tones and phonological profiles of the Chinese loanword strata must be examined in a later study.



Map 1. Map of Hainan (adapted from Chen 2017)

According to Chen (2018: 85), Yongxing belongs to eastern Ong-Be, a branch of the Kra-Dai language family. The glossonym *Yongxing* is, in fact, an exonym, borrowed from Mandarin *Yǒngxīng* (永興). Should a local of the township be asked what language they speak, the typical response is /kaŋ3 vɔ3/, literally 'speak village'; i.e., "to speak (our) village (language)".

Native speakers do not refer to their language simply as /vɔ3/ 'village'; and the verb /kaŋ3/ 'to speak' cannot be omitted. The phrase /kaŋ3 vɔ3/ is commonly used as an autonym in eastern Ong-Be speaking areas in today's Haikou, although the actual pronunciation varies from dialect to dialect.[1] Considering that the geographical distribution of each eastern Ong-Be dialect

[1] The name *Ong-Be* was first reported in François Marie Savina (1965), focusing on the Changliu (長流) variety. This autonym, meaning "village people", refers to the speakers, not their language.

correlates with an administrative division in Haikou, this paper adopts the exonym *Yongxing* to specify the Ong-Be variety under scrutiny.

2. The synchronic phonology of Yongxing

This section consists of a description of Yongxing phonology, based partially on the work of Chen (2018: 69–70). Segmental and suprasegmental features will be discussed in §2.1 and §2.2 respectively.[2]

2.1 The phoneme inventory of Yongxing

As indicated in Table 1, Yongxing has eighteen basic consonants. Three stop series: voiceless unaspirated /t k ʔ/, voiceless aspirated /pʰ kʰ/, implosives /ɓ ɗ/. Nasals /m n ŋ/. Voiceless fricatives /s h/, voiced fricatives /v z/, voiceless affricate /ts$^{(h)}$/. Voiced alveolar lateral /l/. Off-glides /w j/.

Table 1. Yongxing consonant inventory

	Bilabial	Labiodental	Alveolar	Palatal	Velar	Glottal
Stops	pʰ ɓ		t ɗ		k kʰ	ʔ
Nasals	m		n		ŋ	
Affricate			ts$^{(h)}$			
Fricatives		v	s z			h
Laterals			l			
Approximants	w			j		

As for stops, Yongxing has a four-way contrast regarding place of articulation: bilabial, alveolar, velar, and glottal. The place of articulation of /ɗ/ is post-alveolar, compared with /t/, which is alveolar or dental. When occurring in coda position, stops are always voiceless and unreleased. The voiceless unreleased stop coda [p] can be considered a neutralized /pʰ/ or the devoiced counterpart of /ɓ/. In other words, aspiration and voicing are neutralized in stop codas. As for fricatives and affricates, /s/ and /z/ are palatalized as [ɕ] and [ʑ] before the high front vowel /i/, and /ts$^{(h)}$/ can be realized as either [tsʰ] or [ts], though the aspirated variant occurs much more

[2] The data used in this study were collected between 2015 and 2022 from several native speakers of Yongxing. In particular §2.1 is an elaborated version of Chen (2018: 69–70).

frequently in our consultants' speech.[3] Like fricatives, affricate /ts$^{(h)}$/ also palatalizes to [tɕ$^{(h)}$] when followed by the high front vowel. Only nasals, glides and voiceless stops are allowed in coda position. By contrast, all consonants listed in Table 1, except for glides, are attested in onset position. A list of words that illustrate each phoneme in the phonological system of Yongxing is provided in Table 2.

Table 2. Example words of each phoneme

Phoneme	Example Word	English Gloss	Chinese Gloss	Example Word	English Gloss	Chinese Gloss
ɓ	/ɓɔ2/	'leaf'	葉	/ɓa4/	'cloud'	雲
p^h	/p^{h}ɔ4/	'to return'	還	/p^{h}a3/	'sky'	天
t	/tiw3/	'cockscomb'	雞冠	/nam4 tia4/	'porridge'	稀飯
ɗ	/ɗɔn4 ɗa1/	'eye'	眼	/ɗe1/	'husband'	丈夫
k	/kə2/	'3SG'	他	/ka3/	'to kill'	殺
k^h	/k^{h}ɔ3/	'light (not heavy)'	輕	/k^{h}ɔn1/	'heavy'	重
ʔ	/ʔɛk7′/	'yoke'	牛軛	/ʔaj1/	'to cough'	咳嗽
m	/mɔ2/	'hand'	手	/maʔ8/	'horse'	狗
n	/nɔ3/	'big'	大	/na3/	'face'	臉
ŋ	/ŋia2/	'snake'	蛇	/ŋaw4/	'rice in the field'	稻
l	/liŋ4/	'neck'	脖子	/la3/	'rice seedling'	稻秧
v	/vɔ3/	'village'	村子	/va2/	'leg'	腿
s	/se1/	'to distribute'	分給	/sa1/	'to grow (flowers)'	種（花草）
z	/zi1/	'empty'	空	/za2/	'1SG'	我
h	/hɔ2/	'to grab'	抓	/hi1/	'market; bazaar'	墟市
ts$^{(h)}$	/ts$^{(h)}$ɔm2/ /ts$^{(h)}$ɛ1/	'cymbals'	鈸	/ts$^{(h)}$iʔ7′/	'to drop; drop' (n.)	滴
w	/saw1/	'noise; voice'	聲音	/haw3/	'head'	頭
j	/saj1/	'moon'	月亮	/haj1/	'comb'(n.)	梳子

[3] There is one word /ts^{h}ut7′ ŋuk7′/ 'cockspur' in which we noticed that /ts^h/ is pronounced as [ts^h] or [t^h] as in [ts^{h}ut7′ ŋuk7′] or [t^{h}ut7′ ŋuk7′].

As indicated in Table 3, Yongxing has eight vowels in its inventory. High /i u/, mid cardinal /e ɛ ɔ o/), low /a/, and central /ə/. Mid cardinal vowels have a two-way contrast.

Table 3. The vowel inventory of Yongxing

	Front	Central	Back
High	i		u
Close-mid	e	ə	o
Open-mid	ɛ		ɔ
Low	a		

Several (near) minimal pairs are presented in Table 4. E.g., (1) /ɗi1/ 'to search' and /ɗe1/ 'husband' for phonemes /i/ and /e/. (2) /se1/ 'to distribute' and /sɛ4/ 'to step on' for /e/ and /ɛ/. (3) /mɔ2/ '2SG' and /ɓak7′ mo4/ 'buttock' for /ɔ/ and /o/. And (4) /ɗɔn4 ko2/ 'throat' and /ku3/ 'nine' for /o/ and /u/.

Table 4. Near minimal pairs of vowels

Phoneme	Example Word	English Gloss	Chinese Gloss	Example Word	English Gloss	Chinese Gloss
i	/ɗi1/	'to search'	找	/li1/	'to flow'	流
e	/ɗe1/	'husband'	丈夫	/se1/	'to distribute'	分給
ɛ	/ɗɛ3/	'uncle (father's younger brother)'	叔叔	/sɛ4/	'to step on'	踩踏
ə	/kə2/	'3SG'	他	/ɗən2/	'to vomit'	嘔吐
a	/na1/	'thick'	厚	/sa1/	'ear'	耳朵
ɔ	/mɔ2/	'2SG'	你	/pʰu4 ɗɔ2/	'navel'	肚臍
o	/ɓak7′ mo4/	'buttock'	屁股	/ɗɔn4 ko2/	'throat'	喉嚨
u	/hu4/	'to collapse'	倒塌	/ku3/	'nine' (as in 90)	九（十）

The canonical syllable structure of Yongxing is CV(G/C/N)^{T}. That is, a syllable can have the following forms: CV^{T}, CVC^{T}, CVN^{T}, or CVG^{T}, where V can represent either a monophthong

or diphthong. Onset is analyzed as obligatory for ease of cross-linguistic comparison, thus considering all onsetless syllables to carry a tone category traceable back to tonal series 1 in the diachronic development of tones.[4] In other words, all seemingly onsetless syllables are considered to have a glottal stop in onset position.

Table 5. Syllable structures

Example Word	English Gloss	Chinese Gloss	Syllable Structure
/pʰa3/	'sky'	天	CV#
/ɓa1/	'fish'	魚	
/zi1/	'empty'	烏鴉	
/sak7′/	'vegetable'	菜	CVC#
/mat7′/	'flea'	跳蚤	
/liʔ7′/	'rice husk'	稻殼	
/zuaʔ7′/	'hard; firm'	硬	
/liap7′/	'to blink'	眨	
/pʰiak8/	'white'	白	
/kʰɔm4/	'freshwater crab'	淡水螃蟹	CVN#
/sɔn1/	'road'	路	
/zɔŋ1/	'nose'	鼻子	
/kaŋ3/	'to speak'	講	
/tuan3/	'garlic'	大蒜	
/liam2/	'sweet'	甜	
/ŋaw4/	'rice in the field'	稻	CVG#
/muj1/	'shadow'	影子	
/ʔaj1/	'to cough'	咳嗽	
/ziaw2/	'to laugh'	笑	
/nuaj3/	'tired'	累	

Table 6 and Table 7 show examples of words with VC and VG rhymes.

[4] In the linguistics literature of East and Southeast Asian tone languages, tones are considered to originate from a voicing contrast on initials, which is the first segment of an onset, at the time of the split. Tonal series 1 is associated with the tones derived from an early voiceless initial and tonal series 2 from an early voiced initial (see Haudricourt 1954, 1961; Matisoff 1973, et al.).

Table 6. Near minimal pairs of VC rhymes

Rhyme	Example Word	English Gloss	Chinese Gloss
ip	/zip8/	'nail'	指甲
ap	/kap8/	'to bite; to gnaw'	咬、啃
ɔp	/kɔp8/	'a species of frog'	田雞
op	/mak8 kop8/	'pumpkin'	南瓜
up	/mak8 kup8/	'winter melon'	冬瓜
at	/ɓat7′/	'grass'	草
ɔt	/ɓɔt7′/	'duck'	鴨子
	/ʔɔt7′/	'one'	一
ot	/ʔot7/	'zongzi; rice dumpling'	粽子
ut	/zut7/	'to burn (firewood)'	燒（柴）
ik	/ɗik7′/	'full; filled'	滿
ek	/ɗek7′/	'to have'	有
ɛk	/ɗot8 ɗɛk8/	'loom'	織布機
ak	/ɗak7/	'to sun-dry'	曬
ɔk	/ɗɔk7/	'to step on'	踩
ok	/ɗok7′/	'to fall off; to drop'	落（雨）
uk	/nok8 ɗuk7/	'squirrel'	松鼠
im	/lim4/	'to lick'	舔
em	/miŋ2 ki2 lem3/	'gecko'	壁虎
	/hem1/	'and'	和
am	/ham1/	'to carry by two people'	抬
ɔm	/kɔm2/	'itchy'	癢
om	/ɗa3 kom4/	'night'	晚上
	/ɗa3 kom55/[a]	'midnight'	半夜
um	/kum2/	'full (after eating)'	飽
in	/ɗin2/	'stone'	石頭
ən	/ɗən2/	'to vomit'	嘔吐
	/vən2/	'seed'	種子
an	/van2/	'shoulder pole'	扁擔
ɔn	/ɗɔn1/	'to scold'	罵
on	/ɗon1/	'to castrate'	閹
un	/ɗun4/	'loose'	鬆
iŋ	/maj4 ɓiŋ1/	'aquatic leech'	水蛭

Table 6. *(continued)*

eŋ	/ɓeŋ1/	'to pull'	拉（扯）
ɛŋ	/vɔn2 zɛŋ3/	'the day before the day before yesterday'	大前天
ɔŋ	/ɗɔŋ3/	'long bench'	凳子
oŋ	/ɗoŋ3/	'pillar; pole'	柱子
uŋ	/ts$^{(h)}$ian1 ɗuŋ1/	'tadpole'	蝌蚪
iʔ	/ɓiʔ7′/	'soft-shell fish'	鱉
	/p^{h}iʔ7′/	'to spit'	吐
eʔ	/ʔa4 ɓeʔ7′/	'father's older brother'	伯伯
ɛʔ	/p^{h}ɛʔ8/	'to take out'	掏
aʔ	/ɓaʔ7′/	'blood'	血
oʔ	/ɓoʔ8/	'belly'	肚子
uʔ	/muʔ7′/	'ant'	螞蟻

a. There are two content words (and a few grammatical morphemes) in Yongxing that carry a 55 non-checked tone, i.e., [kom^{55}] 'midnight' and 'to go' [ɓɛj^{55}]. However, the pitch value 55 is not attested in the tonal inventory of non-checked citation tones in the native layer of Yongxing. It is not clear whether these two words evolved under the influence of the Shishan (石山) variety bordering Yongxing Township. Based on fieldwork data, the Shishan equivalents for 'night' in 'midnight' and 'to go' are [kom^{55}] and [ɓəj^{55}], respectively.

Table 7 shows that /ɛj/ and /aj/ are distinctive rhymes, as supported by the minimal pair /mɛj2/ 'drunk' and /maj2/ 'good'. The words /hɔj1/ 'shellfish', /hoj1/ 'lime', and /huj4/ 'bowl' serve as good examples for another three contrastive rhymes, i.e., /ɔj/, /oj/, and /uj/. The pair /niw3/ 'to sniff' and /new3/ 'withered' shows the need to separate /iw/ from /ew/.

Table 7. Example words of VG rhymes

Rhyme	Example Word	English Gloss	Chinese Gloss	Example Word	English Gloss	Chinese Gloss
ɛj	/ɗɛj2/	'rotten'	腐爛	/kɛj1/	'chicken'	雞
	/mɛj2/	'drunk'	醉	/ŋɛj4/	'two'	二
aj	/ɗaj2/	'rainbow'	彩虹	/kaj4/	'excrement'	屎
	/maj2/	'good'	好	/ŋaj2/	'cooked rice'	乾飯
ɔj	/hɔj1/	'shellfish'	蛤蜊	/ɗɔj1/	'and'	和
	/pʰɔj3/	'liver'	肝	/mɔj1/	'thread'	線
oj	/hoj1/	'lime'	石灰	/ɗoj3/	'to pound (rice)'	舂（米）
uj	/huj4/	'bowl'	碗	/kuj1/	'turtle'	烏龜
iw	/niw3/	'to sniff; to smell'	聞、嗅	/ziw4/	'mat'	草蓆
ew	/new3/	'withered'	枯萎	/ɗew2/	'to run'	跑
aw	/naw4/	'new'	新	/haŋ^{55} ɗaw2/	'under; below'	下面
əw	/zəw2/	'oil'	油	/ɓak2 ɗəw2/	'door'	門
ɔw	/zɔw1/	'urine'	尿	/ɗɔw4/	'ash'	灰燼

Note that the working orthography used in published Chinese materials dealing with contemporary Ong-Be varieties does not distinguish off-glides from vowels. For example, /ŋaw4/ 'rice in the field' in Table 2 is written as /ŋau4/ in Liang & Zhang (1997: 210). A VV sequence results, despite this VV sequence being phonologically VG. We consider this vocalic sequence to be VG, because this VV sequence cannot be followed by another consonant, whereas a true diphthong can, as exemplified by *pʰiak* 'white' where the diphthong /ia/ precedes a stop coda (also see Table 8).

In this paper, /ia/ and /ua/ are treated as diphthongs because (1) phonotactics shows that these vowels always occur together, and (2) no other consonant clusters, such as C_1C_2- or Cl-, are attested. Such a vocalic sequence, like monophthongs, can be followed by a coda (see Table 8). Moreover, only /i/ and /u/ can co-occur with /a/ in the rhymes. It is more economical to treat /ia/ and /ua/ as diphthongs, than to explain why there are distributional gaps in the co-occurrence with on-glides /j/ and /w/ for other vowel qualities.

Table 8. Phonotactics of diphthongs

Rhyme	Example Word	English Gloss	Chinese Gloss
ia	/ɓak7′ ɓia3/	‘shoulder’	肩膀
iap	/liap7′/	‘to blink’	眨（眼）
iat	/hiat7′/ [hiɛt]	‘iron’	鐵
iak	/ziak8/	‘tree root’	樹根
iam	/liam2/	‘sweet’	甜
ian	/ɓian1/ [ɓiɛn]	‘to buy’	買
iaŋ	/ɓiaŋ1/	‘thin’	薄
iaw	/liaw4/	‘many; plenty’	多
ua	/zua3/	‘clothes’	衣服
uan	/ʔuan2/	‘to bent’	彎曲
uaŋ	/tuaŋ2/	‘goat’	羊
uat	/kʰuat7/	‘wide’	寬
uak	/kuak7′/	‘hoe’	鋤頭
uaj	/nuaj3/	‘tired’	累

It is noteworthy that -*a*- in /ia/ is often raised to [ɛ] when followed by an alveolar coda /t/ or /n/, as illustrated by ‘iron’ and ‘to buy’ in Table 8. The nucleus of the rhymes [iɛt] and [iɛn] are analyzed as /ia/ for two reasons. First, less innovative speakers still pronounce /ia/ as [ia] even when it precedes -*t* or -*n*. Second, the distribution of /ia/ followed by a coda shows gaps in not having the [+alveolar] series, if this /ia/ sequence were treated as /iɛ/.

The rhyme /em/ can be pronounced as [em] or [iəm]. The variant /em/ is chosen as the underlying representation for two reasons. Rhymes composed of /e/ followed by a coda show a wider distribution, as evident in /miŋ2 ki2 lem3/ ‘gecko’, /ɓeŋ1/ ‘to pull’, /ɗek7′/ ‘to have’, /keʔ7′/ ‘to untie’, /ɗej3/ ‘bag’[5], and /new3/ ‘withered’, whereas only /ən/ (as in /mən2/ ‘to have’) and /əw/ (as in /səw4/ ‘chopsticks’[6]) are observed. On the other hand, if /iəm/ were selected as the basic form, the fact that no other rhymes containing /iə/ are attested remains unaccounted for, cf. Table 8. A rhyme table of Yongxing is provided in Table 9.

[5] This is a Chinese loan unreconstructible to the Proto-Ong-Be level.
[6] This is an early Chinese loan shared across Ong-Be varieties, based on Chen (2018: 97).

Table 9. A summary of Yongxing rhymes

Nucleus	-p	-t	-k	-ʔ	-m	-n	-ŋ	-j	-w
i	ip	it	ik	iʔ	im	in	iŋ	—	iw
e	—	—	ek	eʔ	em	—	eŋ	(ej)	ew
ɛ	—	—	ɛk	ɛʔ	—	—	ɛŋ	ɛj	—
a	ap	at	ak	aʔ	am	an	aŋ	aj	aw
ə	—	—	—	—	—	ən	—	—	əw
ɔ	ɔp	ɔt	ɔk	—	ɔm	ɔn	ɔŋ	ɔj	ɔw
o	op	ot	ok	oʔ	om	on	oŋ	oj	—
u	up	ut	uk	uʔ	um	un	uŋ	uj	—
ia	iap	iat	iak	—	iam	ian	iaŋ	—	iaw
ua	—	uat	uak	uaʔ	—	uan	uaŋ	uaj	—

2.2 The tonal system of Yongxing

2.2.1 The citation tones

According to Bao (2011: 2), the term *citation tone* refers to "tones that are lexically specified for each morpheme". In Yongxing there are seven citation tones (non-checked and checked)[7] as shown in Figure 1 with real time duration on the left and normalized time on the right, the tonal contours of which are all based on monosyllabic words. The tonemes are arranged following Chen (2018: 70), who observes the Kra-Dai convention for discussing historical development of tone categories. In this production-based tonal inventory, the F0 data used for drawing tonal contours were produced by a single female speaker born in the late 1980s and were extracted using ProsodyPro (Xu 2013). F0 was converted to z-score. Non-checked tones are represented by a solid line, while checked tones are depicted by a dashed line. Numerals 0 through 9 on the X axis correspond to 0%–90 % of a syllable with normalized time. It is worth noting that this paper is descriptive in nature and all the tone figures supplemented here are for illustration purposes only.

[7] In Chinese philology, non-checked tones refer to those that fall on either open syllables or closed syllables with a sonorant coda, such as a nasal or a glide. Checked tones are only attested in syllables that end in an unreleased voiceless stop. In the Chinese convention employed in this article, numerals 1 through 4 are reserved for non-checked tones and numerals 7 and above for checked tones. Prime tones signify diachronic tonal splits based on vowel length.

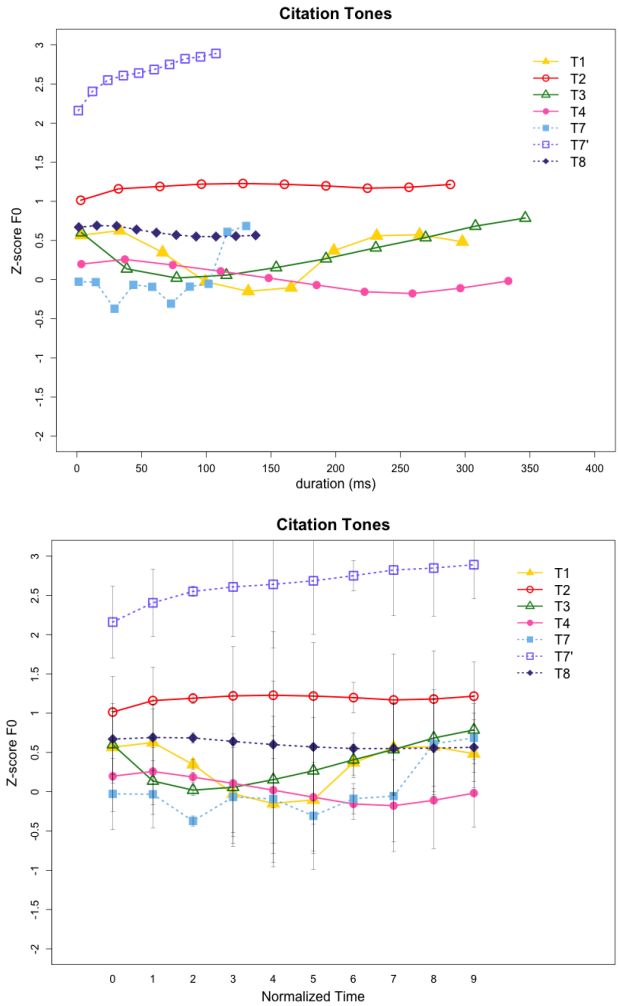


Figure 1. Tonal contours of each toneme (one female speaker; averaged over three tokens for Tone 1, five tokens for Tone 2, three tokens for Tone 3, five tokens for Tone 4, four tokens for Tone 7, four tokens for Tone 7′, and two tokens for Tone 8)

Generally speaking, contemporary Yongxing has two level tones (Tone 2 and Tone 4), two contoured tones (Tone 1 and Tone 3), and three checked tones (Tone 7, Tone 7′, and Tone 8) (Figure 1). Low pitch and glottalization are tightly correlated, because low tones, i.e., Tone 1, Tone 4, and Tone 7, are all glottalized in showing irregular amplitude and a low rate of vocal cords vibration (see Figure 2–Figure 3).[8] Checked tones are half the length of non-checked tones.

[8] We acknowledge that there is a difficulty in separating a personal speaking style from a phonological system with

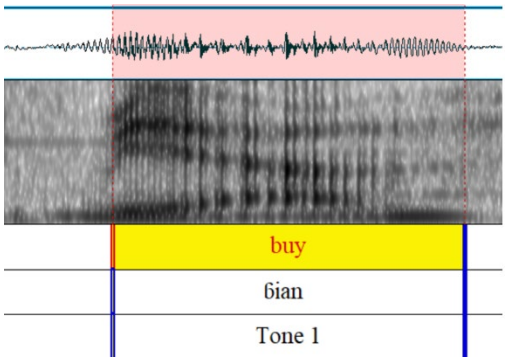


Figure 2. Glottalization of Tone 1

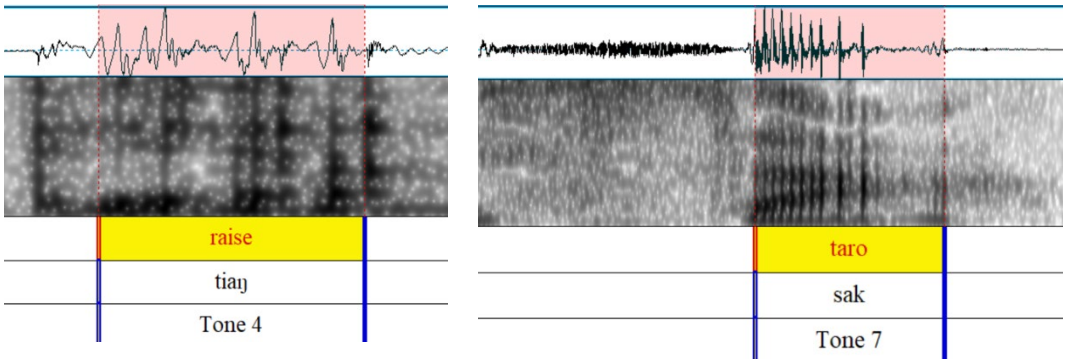


Figure 3. Glottalization of Tone 4 and Tone 7

Tone 1 is a falling-rising tone, with the valley occurring at around the midpoint, *ca.* 40%~50%. Because of its tone shape, glottalization is commonly observed, especially during, but not limited to, the falling-rising transition. Tone 2 in Yongxing is a 'non-low' level tone (explained below), while Tone 3 is a rising tone, where the valley takes place at around 20%. By contrast, Tone 4 is a low-level tone, and like most of the low-level tones, it falls slightly at the second half of a syllable. Tone 3 and Tone 1, both contoured, differ mainly in the timing when the valley takes place. As for checked tones, Tone 7 is a low tone, Tone 7′ a high tone, and Tone 8 a mid tone. As reflected in their standard deviation, low non-contoured tones, namely Tone 4 and Tone 7, tend to be accompanied by different degrees of glottalization.

As can be seen in Figure 1, the relative pitch height of Tone 2 (high level) falls in between Tone 7′ (high checked) and Tone 8 (mid checked). Given that Tone 2 is higher than the mid checked tone, from now on, we refer to it as a high-level tone, in contrast to another level tone,

both contrastive pitch and phonation, considering that our F0 data come from a single speaker. Whether one individual is eligible for representing their own community is open for discussion.

Tone 4, which is lower than the mid checked tone.[9] A list of example words of each toneme is presented in Table 10 with corresponding tone categories. From an impressionistic point of view, the aforementioned seven citation tones are also rendered as [213] (T1), [44] (T2), [24] (T3), [21] (T4), [11] (T7),[10] [55] (T7′), and [33] (T8) using the Chao tone letters for ease of comparison with materials published in China.

Table 10. Example words of each toneme

Example Word	Toneme	Tone Category[11]	English Gloss	Chinese Gloss
ɗa^{213}	Tone 1	A1	'eye'	眼
sa^{213}	Tone 1		'ear'	耳朵
tɔn^{213}	Tone 1		'teeth'	牙齒
naŋ^{213}	Tone 1		'skin'	皮膚
vɔn^{44}	Tone 2	A2	'fur; feather'	動物毛
mɔ^{44}	Tone 2		'hand'	手
haw^{24}	Tone 3	BC1	'head'	頭
na^{24}	Tone 3		'face'	臉
lin^{21}	Tone 4	BC2	'tongue'	舌頭
nan^{21}	Tone 4		'meat; flesh'	肉
ɓak^{11}	Tone 7	D1	'mouth'	嘴
ʔɔt^{11}	Tone 7		'rice dumpling'	粽子
kok^{55}	Tone 7′		'feet'	腳
ɓɔt^{55}	Tone 7′		'duck'	鴨子
ŋuk^{33}	Tone 8	D2	'mucus'	鼻涕
nok^{33}	Tone 8		'bird'	鳥
mit^{33}	Tone 8		'knife'	刀子
hap^{33}	Tone 8		'cloth'	布

It should be pointed out that, as illustrated by /saŋ1/ 'mountain' in /mu1 saŋ1/ 'wild pig (lit. pig mountain)' in Figure 4, there are cases where Tone 1 in phrase-final position is realized as a low

[9] Tone 55 mentioned in Table 6 is higher than Tone 2 but lower than Tone 7′, with a z-score between 1.5 and 2 as its citation form.

[10] Tone 7 is numerally transcribed as [21] in Chen (2018: 70). Either way, [21] and [11] do not contrast in the tonal inventory of checked tones.

[11] A, B, C, and D listed under *Tone category* are associated with proto-tone categories in Haudricourt (1954; 1961) and Matisoff (1973), in which Tone A is proposed to develop from syllables containing a nasal or glide coda, or zero coda, Tones B and C from, respectively, an erstwhile fricative coda and a glottal stop coda, and Tone D from a stop coda that is not a glottal stop. Numerals 1 and 2 are associated with the voicing of syllable initials at the time of tonal split. See Footnote 5 regarding tonal series 1 and 2.

tone, which happens to be the tone value of Tone 4. In this case, the tonal curve of the second half of Tone 1 (points 5 through 9 of the second syllable) as a dipping tone remains flat even in non-sandhi (phrase-final) position. Whether there is an emerging tonal merger between Tone 1 and Tone 4 or if this tonal phenomenon only occurs on a phrasal basis requires controlled experimental investigation before a conclusion can be made.

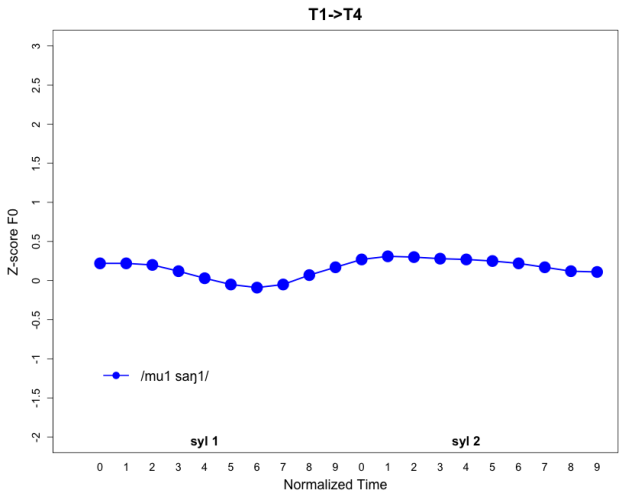


Figure 4. Tonal contour of /mu1 saŋ1/ 'wild pig'[12]

2.2.2 Tone alternation and tonal neutralization

In addition to citation tones, Yongxing exhibits optional tone alternation, in which the tone of a non-final syllable of a word or phrase can change from their respective citation form to a derived form, as illustrated in Figure 5. To put it differently, citation tones alternate with sandhi forms in certain contexts. Yongxing also shows neutralization in that fewer distinctions are attested with respect to tonal contour in non-phrase-final position.

[12] **syl 1** and **syl 2** stand for the first syllable and the second syllable, respectively.

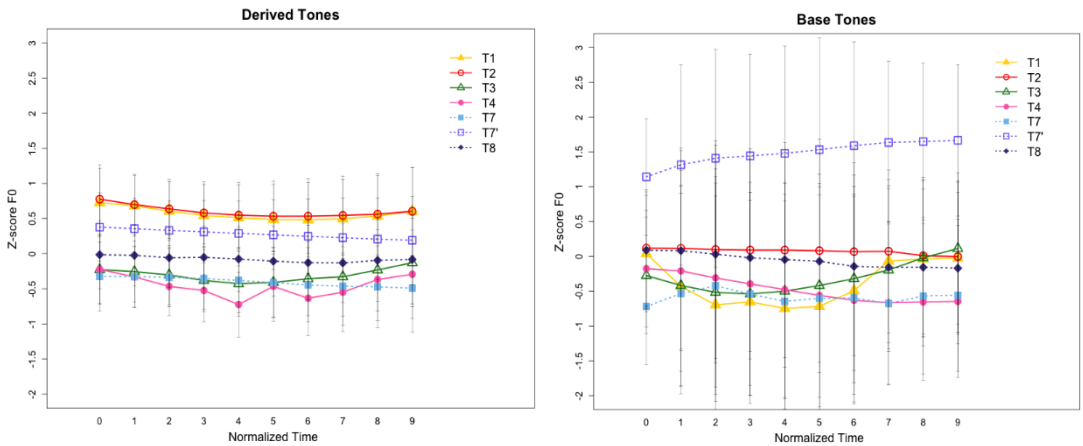


Figure 5. A comparison of tonal contours of derived tones (one female speaker; averaged over 27 tokens for Tone 1, 16 tokens for Tone 2, 45 tokens for Tone 3, 38 tokens for Tone 4, 23 tokens for Tone 7, 41 tokens for Tone 7′, and 45 tokens for Tone 8)[13] and base tones (one female speaker; averaged over 41 tokens for Tone 1, 42 tokens for Tone 2, 40 tokens for Tone 3, 36 tokens for Tone 4, 13 tokens for Tone 7, 32 tokens for Tone 7′, and 32 tokens for Tone 8)

The current study is concerned with tone patterns found in disyllabic phrases. A comparison of the tonal contours of base tones, i.e., the surface representation of a lexical tone that is identical to its underlying representation when occurring in phrase-final position, and those of citation tones, which can be considered phrase-final as well when pronounced in isolation, is presented in Figure 6. The tone shapes of the base tones are from the second syllable of disyllabic phrases, and those of citation tones are reproduced from Figure 1, which are based on data from monosyllabic words.

In Figure 6 the tone patterns of Tones 1 through Tone 8 in the left-hand panel correspond respectively to a dipping tone, a high-level tone, a rising tone, a low level tone, a low checked tone, a high checked tone, and a mid checked tone, which mirror the curves of citation tones in the right-hand panel. Contrary to the aforementioned base tone patterns, in Figure 5 derived tones (those of the first syllable of a disyllabic phrase) are all flat. We thus conclude that Yongxing shows traits of tone sandhi: a tonal adjustment of one tone into another contrastive

[13] The derived Tone 1 in the figure is averaged over a series of Tone 1 followed by another tone (T1+TX). The same applies to the derived Tone 2 through the averaged derived Tone 8. For more details regarding each tonal combination, see Figure 7-Figure 13.

tone. Specifically, it shows positional tone sandhi defined in Bao (2011),[14] in which tone sandhi is triggered by its position, considering that all contour tones flattened in non-phrase-final position. Tone sandhi is virtually phonologically conditioned, in contrast to morphologically conditioned "tone change" (M. Chen 2000: 31).

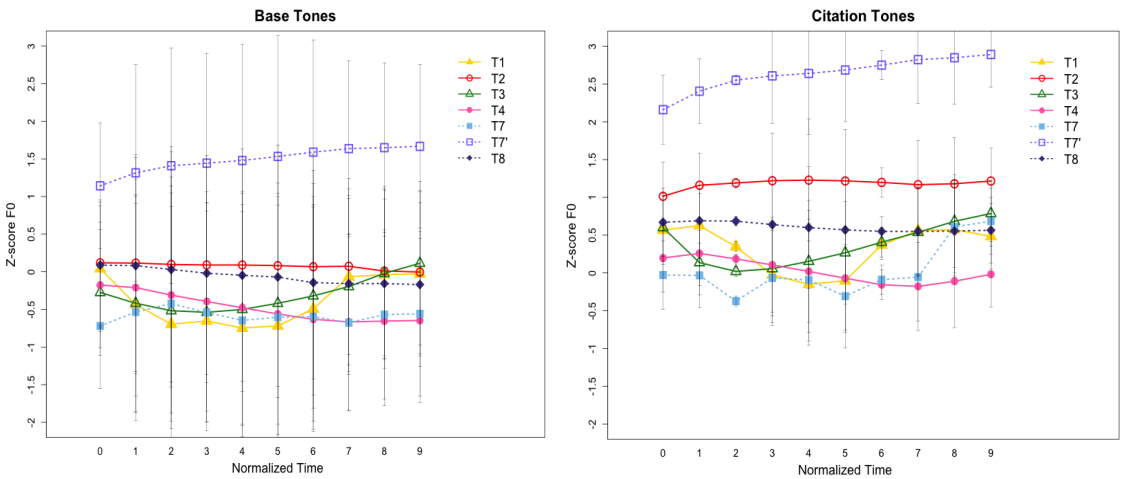


Figure 6. Tonal contours of phrase-final tones and citation tones

Despite the fact that contour alternation is unattested in tonemes with a citation form that bears a flat contour, i.e., Tone 2 (high level), Tone 4 (low level), Tone 7 (low checked), Tone 7′ (high checked), and Tone 8 (mid checked), their counterparts in non-phrase-final position show adjustments in pitch height. For example, Figure 5 indicates that the averaged base tone of Tone 7′ is between a z-score of 1 and 1.5 and that of Tone 3 between -0.5 and 0.1, whereas the averaged derived tone of Tone 7′ falls in-between 0 and 0.5 and the range for the averaged derived Tone 3 is between -0.5 and 0. However, the reader should bear in mind that having tonal variants for each toneme in non-final position does not guarantee that these surface forms are categorized as various distinctive lexical tones or that there are new tonemes derived from the aforementioned citation tones. In the case of checked tones, the relative pitch height among Tones 7, 7′, and 8 are retained in their averaged derived forms. The categorical pitch contrast between the averaged forms of Tone 2 and Tone 4 in non-final position shows in parallel fashion.

[14] Bao (2011: 2–10) proposes four types of tone sandhi patterns: (i) contextual tone sandhi, (ii) positional tone sandhi, (iii) templatic tone sandhi, and (iv) tone spread. See Bao (2011) for a detailed discussion regarding each type.

Similar tonal phenomena have also been reported in Longtang (龍塘), another eastern Ong-Be variety spoken in Haikou, in Liang & Zhang (1997: 28).[15] In the case of Yongxing, there are circumstances where the same lexical items or phrases were given to the same consultant on different days, and the consultant would employ different tonal behaviors between sessions. For example, a syllable in sandhi position would be realized using a citation tone in one instance or a sandhied level tone in another. Although tone alternation could be optional, such neutralization of a contour tone to a level tone is robust in contemporary Yongxing. It is possible that contextual cues might provide enough information for listeners to process sentences despite neutralized tone identity. The following sections focus on how different tone sequences surface when neutralization is observed.

An overview of how Tone 1 alters in sandhi position in disyllabic phrases (as depicted by 0–9 of the first syllable) is presented in Figure 7. The reader can also see that Tone 1 in sandhi (non-phrase-final) position is influenced by the following tones with respect to pitch height. Tone 1 [213] changes to a lower tone (below a z-score of 0.5), when followed by a low tone (checked and non-checked) or a dipping tone. When Tone 1 is followed by a high level tone (T2) and a mid checked tone (T8), it changes to a mid tone (between a z-score of 0.5 and 1). When occurring before a high checked tone (T7′) and a rising tone (T3), Tone 1 has a high tone (a z-score of 1) as a tonal variant in sandhi position and its contour even rises at the end before Tone 7′. Whether phrase structure plays a role in tone alternation will be addressed in later sections.

As for Tone 2 [44] in sandhi position, although it remains a flat tone, it is generally lowered as shown in Figure 8. That is, the pitch range of the base tone (points 0 through 9 of the second syllable) is between a z-score of 1 and 1.5, and that of the derived Tone 2 is between 0.5 and 1 (as depicted by 0–9 of the first syllable). Unlike the derived Tone 1, sandhied Tone 2 is not subject to the influence of the adjacent linguistic environment.

[15] The original text reads as follows: “這幾種變調，在說話時，很自然地就變調了，如果發音人說得慢一些，或請他重複時，往往又不變調，當我們複述時，變調或不變調發音人也沒有什麼異議。”.
My translation: “These tone sandhi patterns occur in connected speech as a natural flow. When our consultants speak more slowly or when we ask them to repeat the tokens, they tend to use the base tones. Consultants find no difference whether we repeat the phrases after them using base tones or derived tones.”

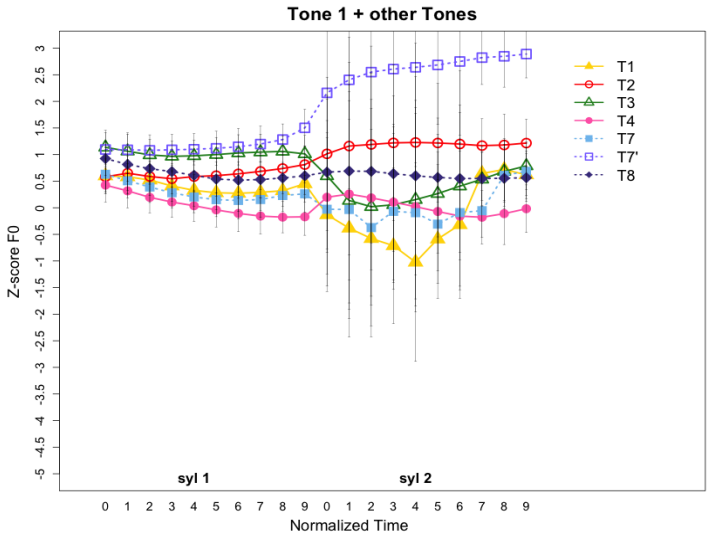


Figure 7. Tone 1 in sandhi position (one female speaker; averaged over four tokens for T1+T1, five tokens for T1+T2, three tokens for T1+T3, five tokens for T1+T4, four tokens for T1+T7, four tokens for T1+T 7′, and two tokens for T1+T8)

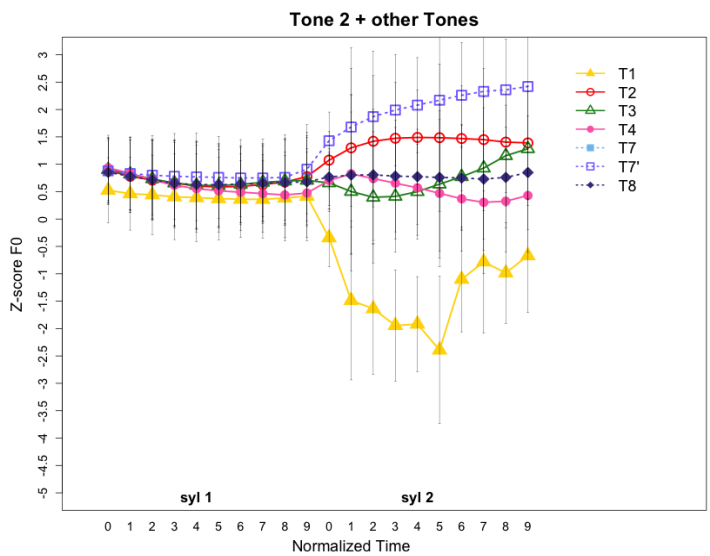


Figure 8. Tone 2 in sandhi position (one female speaker; averaged over five tokens for T2+T1, two tokens for T2+T2, three tokens for T2+T3, two tokens for T2+T4, one tokens for T2+T7′, and three tokens for T2+T8)[16]

[16] Our data show a gap in the T2+T7 sequence.

Regarding Tone 3 [24], when it occurs in non-phrase-final position, it has a flattened tone curve (see Figure 9). At first glance, it seems that when Tone 3 is followed by Tone 4 (the solid pink line with a point marker), its contour rises at the beginning of the first syllable and is associated with large standard deviations. Because many of the corresponding audio files contain creaky voice, we propose that such a contour rise is caused by glottalization throughout the T3+T4 tone sequence (also see below).

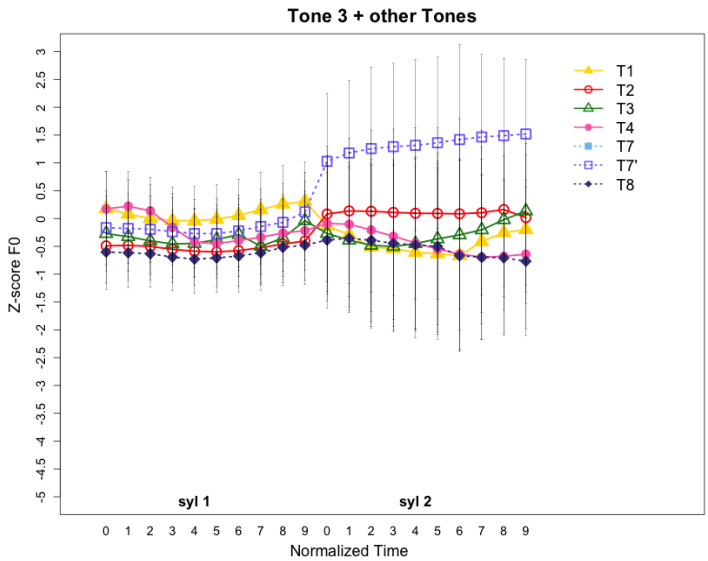


Figure 9. Tone 3 in sandhi position (one female speaker; averaged over 10 tokens for T3+T1, six tokens for T3+T2, seven tokens for T3+T3, five tokens for T3+T4, five tokens for T3+T7′, and 12 tokens for T3+T8)[17]

In terms of Tone 4 [21], in Figure 10, fluctuations of tonal contours of a T4+TX sequence are induced by glottalized Tone 4, which is a low-level tone in Yongxing. Strong glottalization spreads across the syllable boundary and results in large standard deviations, which hinders our ability to interpret acoustic portraits of the derived Tone 4 as a level one. However, we have an auditory impression that Tone 4 by and large sounds level in non-phrase-final position.

Checked tones in Yongxing are generally short in duration and auditorily flat in contour. They do not seem to demonstrate contour alternation in sandhi position; nevertheless, alternations in pitch range are observed. Take Tone 7 [11] for instance. Figure 11 shows that in the T7+T7 sequence (the dashed azure line with a square marker), the derived tones of Tone 7 (0–9 of the first syllable) are raised to around a z-score of 0.7 in contrast to below a z-score of

[17] Our data have a gap in the T3+T7 sequence.

-1.5, where Tone 7 is at when it surfaces as a base tone (0–9 of the second syllable). Similar to the case of Tone 4, Tone 7 is also glottalization-prone, for it is a low tone.

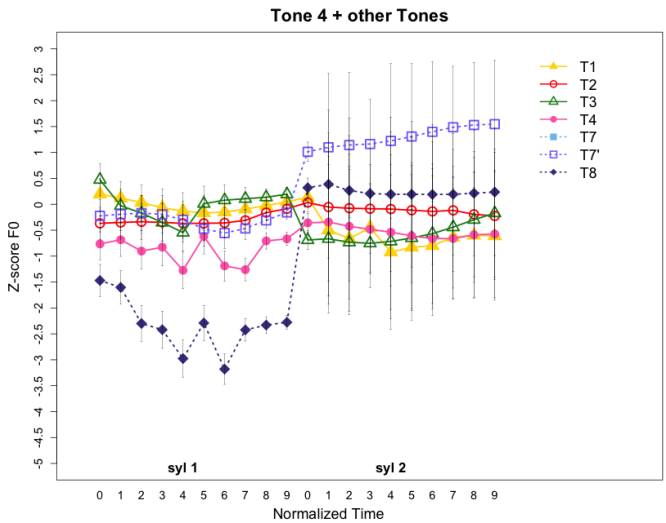


Figure 10. Tone 4 in sandhi position (one female speaker; averaged over seven tokens for T4+T1, seven tokens for T4+T2, eight tokens for T4+T3, seven tokens for T4+T4, six tokens for T4+T7′, and three tokens for T4+T8)[18]

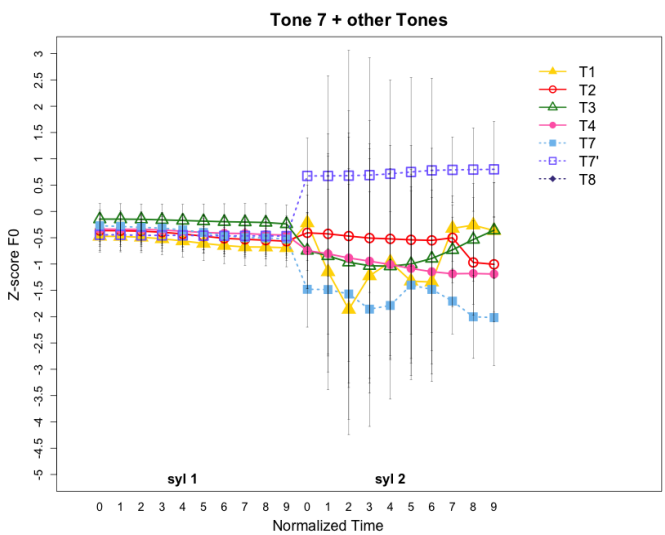


Figure 11. Tone 7 in sandhi position (one female speaker; averaged over four tokens for T7+T1, six tokens for T7+T2, five tokens for T7+T3, two tokens for T7+T4, four tokens for T7+T7, and two tokens for T7+T7′)[19]

[18] Our data contain a gap in the T4+T7 sequence.

[19] Our data show a gap in the T7+T8 sequence.

In Yongxing, Tone 7′ [55] has the highest pitch of all tonemes. When followed by another toneme, the derived tones of Tone 7′ are lower than its base form, as Figure 12 suggests. However, the T7′+T1 sequence (the solid yellow line with a triangle marker) shows that the sandhied forms of Tone 7′ are as high as its base form. In addition, when the derived Tone 7′ occurs before another Tone 7′, its tone curve rises at the end as influenced by the following Tone 7′.

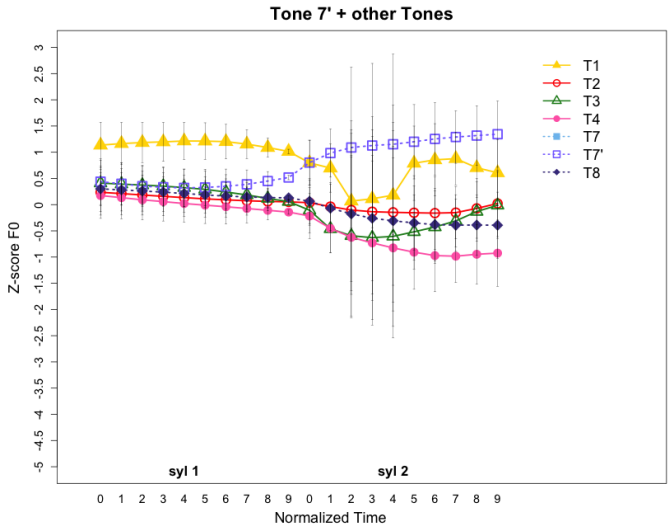


Figure 12. Tone 7′ in sandhi position (one female speaker; averaged over four tokens for T7′+T1, 12 tokens for T7′+T 2, six tokens for T7′+T3, six tokens for T7′+T4, five tokens for T7′+T7′, and eight tokens for T7′+T8)[20]

Regarding Tone 8 [33], its pitch range occurs between a z-score of -0.5 and 0.7 in sandhi position (see Figure 13). Its pitch generally falls below a z-score of 0.5, except for when followed by another Tone 8, where there seems to be no alternation between its citation form and derived form at a z-score of 0.7. When preceding the Tone 4 [11] and Tone 7, two of the low-pitched tones, as well as Tone 2 [44], the high non-checked tone, the sandhied Tone 8 lowers to below a z-score of -0.3. The reader can also see that the derived Tone 8 has a higher offset when followed by a high checked tone (Tone 7′).

Argument structure does not necessarily trigger tone alternations in Yongxing. For example, Figure 14 contains a T1+T8 sequence formed by /sa1 mak8/ ‘ear deaf’[21] (the solid

[20] Our data have a gap in the T7′+T7 sequence.

[21] Yongxing usually places modifiers after the elements they modify, as illustrated by /nɔm1 kɛj1/ ‘chicken egg’, which consists of /nɔm1/ ‘egg’ followed by the word for ‘chicken’, /kɛj1/. However, exceptions are attested, as exemplified by /maj4 kɛj1/ ‘hen’ formed by ‘female’ plus ‘chicken’, where the modifier, ‘female’, precedes the head noun ‘chicken’. Whether /sa1 mak8/ ‘ear deaf’ has an argument structure of Subject-Verb or Noun-Adjective

azure line with a point marker), a complementizer phrase or a noun phrase, and /ɓian1 zap8/ 'to buy husked rice' (the solid dark blue line with an upward-pointing triangle marker), a verb phrase. Both phrase types show an overlapping tone curve.

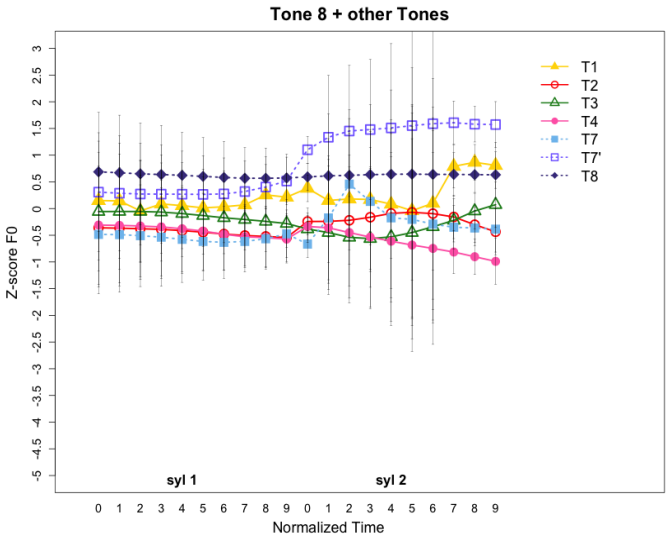


Figure 13. Tone 8 in sandhi position (one female speaker; averaged over six tokens for T8+T1, four tokens for T8+T2, eight tokens for T8+T3, nine tokens for T8+T4, five tokens for T8+T7, nine tokens for T8+T7′, and four tokens for T8+T8)

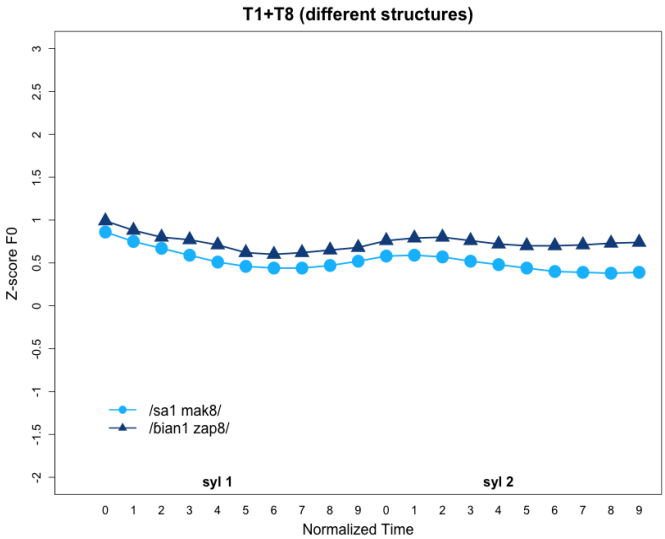


Figure 14. Tone 1 + Tone 8 with different phrasal structures

(or Noun-Noun) is open for discussion. In either case, this phrase does not contain a verb followed by an object as in /ɓian1 zap8/ 'to buy husked rice'.

On the other hand, /zan2/ 'house' in /zan2 ɓaŋ1/ 'The sky is bright' (lit. 'house' + 'bright') is distinctively higher in pitch range when compared with /zan2/ in /zan2 zam1/ 'The sky is dark' as well as /hɔ2/ 'to grab' in /hɔ2 ma1/ 'to grab dog' and /hɔ2 kɛj1/ 'to grab chicken'. Since the tonal environment remains the same for the given phrases in Figure 15, the discrepancy in sandhied Tone 2 might not be attributed to argument structure or lexicalization. One might argue that compared to /zan2 ɓaŋ1/ 'The sky is bright', /zam1/ in /zan2 zam1/ 'The sky is dark' is realized here as a level tone, not a dipping tone, which leads to a different tone pattern. If we further compare the aforementioned T2+T1 sequences with T2+T4 sequences, we see that in Figure 16, /zan2/ (the first syllable of the solid azure line with a point marker) in /zan2 ɓaŋ1/ remains higher than the derived tones of Tone 2 in /hɔ2 pʰun4/ 'to grab goose'(the first syllable of the solid light green line with a square marker) and /zan2 ŋua4/ 'tiled house' (the first syllable of the solid emerald green line with a square marker), the internal structures of which also differ but show the same tone pattern. Figure 16 again indicates that different argument structures do not necessarily result in divergent tone alternation.

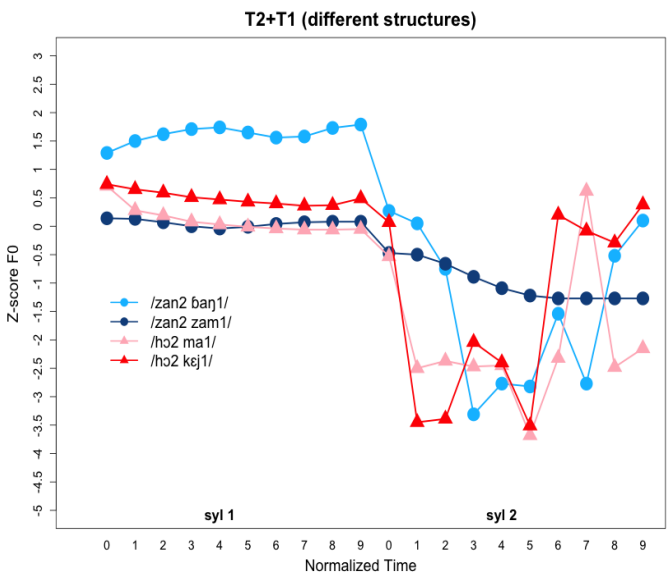


Figure 15. Tone 2 + Tone 1 with different structures

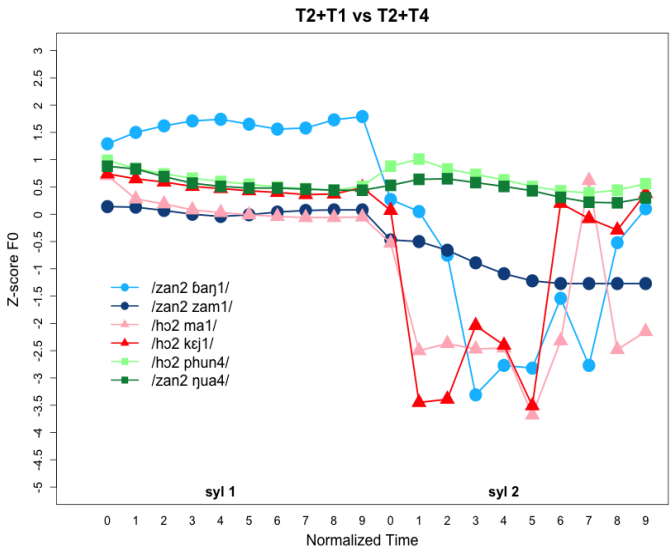


Figure 16. T2+T1 vs T2+T4 with different structures

3. Discussion and conclusion

Linguistically-speaking, the phonology of Yongxing is typical of Kra-Dai languages. Most Kra-Dai linguistic traits documented in the literature also apply to the phonological profile of Yongxing. First, our finding in Table 1 matches what is presented in Pittayaporn (2021: 435) in that in terms of place of articulation, Kra-Dai languages usually "show a five-way contrast distinguishing labial, alveolar, (alveolo)-palatal, velar, and glottal".[22] The fact that Yongxing contains voiced implosives and voiceless plain unaspirated and aspirated stops also supports the general observation that regarding laryngealization, Kra-Dai languages tend to have a finer contrast in stops. In addition, as in Yongxing, most Kra-Dai languages only permit stops, nasals, and glides in the coda. However, Yongxing differs from most Kra-Dai languages in that it lacks not only a vowel length distinction but also secondary cardinal vowels, such as /ɯ/ and /ɤ/, cf. Pittayaporn (2021: 437–438). Phonation and aspiration confined to a particular type of onset is not attested in Yongxing either, unlike Maonan and Trùng Khánh Tay of the Kra-Dai language family (see Lu 2008; Pittayaporn & Kirby 2017 for more details).

Suprasegmental-wise, Yongxing has seven citation tones and every syllable carries a lexical tone. §2.2 shows that Yongxing employs predominantly tone height and tone shape to differentiate meanings and functions. Yongxing thus qualifies phonologically as a tonal

[22] The labiodental series in our Table 1 is listed as a subset of the labial series in Pittayaporn (2021).

language in that Yongxing uses "contrastive pitch to distinguish lexical items or to mark grammatical functions" (Brunelle & Kirby 2016: 193). If Yongxing were registral, it would be a distinctive phonation type (modal voice, breathy voice, and tense voice), instead of contrastive pitch, that serves as the primary cue (see Henderson 1952; DiCanio 2009; Brunelle & Kirby 2016, to name a few). However, Svantesson (1983) and Mazaudon & Michaud (2008) have each proposed that fundamental frequency and voice quality should be treated as different inherent components of a single property, i.e., tone, because some languages possess a suprasegmental system that manifests both contrastive pitch and contrastive phonation type. Take, for example, Northern Vietnamese (Brunelle 2009), Burmese (Bradley 1982; Watkins 2001), and Black Miao (Kuang 2013).

Pittayaporn (2021: 439–440) reports that glottalization and laryngealization are redundant features of tones in Kra-Dai languages. In the case of Yongxing, both Tone 1 and Tone 4 are subject to constant glottalization throughout the rhymes. By contrast, although the citation form of Tone 3 has a pitch range similar to that of Tone 1, glottalization is uncommon in Tone 3. If glottalization were not an integrated part of the tone features in the language under discussion, it should occur inconsistently, unlike the contrast between modal Tone 3 and glottalized Tone 1 reported here.[23] As for the checked tones, Tone 7 (low checked) is also frequently glottalized, either from the middle part of the syllable and onwards or throughout the entire syllable. Glottalization, nevertheless, has never been found in Tone 7′ (high checked). Taken together, our data indicate that glottalization, although less salient when compared to Northern Vietnamese dialects, could be interpreted as part of the tone package of Tones 1, 4, and 7, considering that glottalization is frequently present with these low tones in Yongxing and such glottalization can spread to adjacent syllables. A similar case involving voice quality and fundamental frequency is demonstrated in Kuang (2017a; 2017b), which show that creaky voice and pitch range co-vary in Mandarin Chinese. We also conclude that in Yongxing, glottalization is triggered by pitch height, not by a stop coda; cf. Michaud (2004), which reveals that in Hanoi Vietnamese, "the final obstruents /p/, /t/, and /k/ are not accompanied by glottalization" (Michaud 2004: 119).

In Yongxing, non-final position is the designated sandhi position, and tone alternation and neutralization prevail, as reflected in Figure 7–Figure 13. Citation forms alternate with derived forms in sandhi position, where there are no contrastive tonal contours but surface level tones. Take Tone 1 for instance. When pronounced in isolation, Tone 1 in Yongxing has a dipping curve, whereas the derived forms of Tone 1 are all level in contour. Another contoured tone,

[23] We thank one of the anonymous reviewers for pointing this out.

Tone 3, also neutralizes to a flattened contour in non-phrase-final position, although neutralization occurs less often and its sandhi forms seem to cluster more around each other, compared with the derived tones of Tone 1. Whether there is a peak delay in the T3+Tx sequences requires further study; cf. Brunelle et al. (2016), which argues that in Vietnamese, it is the peak of a rising tone realized onto the following syllable that leads to misidentification of tone identity. As for Yongxing citation tones that bear a flat tone shape, they do not change in slope when occurring in sandhi position; instead, they change in pitch height. The productivity of tone alternation and neutralization in Yongxing seems to bear witness to the situation that the domain of full preservation of a lexical tone is shifting from an originally syllable-based window to the right edge of a word/phrase, in which the tonal identity is kept only in word/phrase-final position, but lost elsewhere in this prosodic domain.

One of the reviewers postulates that the identity of each lexical tone is maintained when there is a prosodic boundary, given that monosyllabic words can be regarded as phrase- and utterance-final as well. Syllables in non-final position can be realized fully, when these syllables are pronounced slowly for pragmatic purposes, such as to emphasize or to disambiguate. While citation forms are preserved through a prosodic boundary, we posit that usage frequency is also at play in that the syntactic boundary between a head verb and a noun phrase functioning as an object in a verb phrase can become blurred in high frequency phrases; the verb phrase as a single constituent thus results. This is evident in the minimal pair /sa1 sak7/ [sa$^{213\text{-}21}$ sak^{11}] 'to grow taro' and /sa1 sak7′/ [sa$^{213\text{-}44}$ sak^{55}] 'to grow vegetables', in which the tonal identity of 'to grow' as a preceding word is lost in connected speech to manifest semantic differences.

Because the derived forms of each toneme have a similar tone shape as the citation forms of the tonemes that are flat, the number of contrastive tones is reduced in sandhi position. At first, fewer tonal distinctions seem to suggest that there is total neutralization, because non-phrase-final position only permits a flattened contour. Yet Yongxing has several lexical tones that bear a flat tone shape. Since both tone shape and tone height serve as phonological cues to discriminate tonemes, having a similar tone shape does not necessarily result in a collapse of all lexical tones into the same tone category. Based only on production data, the relative pitch height of the averaged derived tones in Figure 5 seem to indicate that the original height relations among three checked tones and between two citation level tones are somewhat retained in sandhi position.[24] However, fundamental frequency, specifically relative pitch height, can become the key parameter in mapping a variety of tonal alternants with a level

[24] Tones 1 and 3 are both contour tones, which differ in where the valley occurs and the degree of glottalization, not tone height.

contour onto distinctive tone categories. If speakers think there is contrastive tone height, then neutralization is incomplete.

In addition, in certain contexts, tonal coarticulation might further contribute to the differences in averaged F0 of the surface representations of each toneme, in which the realization of a tone is influenced by neighboring tones. Tonal coarticulation is exemplified by the aforementioned minimal pair /sa1 sak7/ 'to grow taro' and /sa1 sak7′/ 'to grow vegetables', given that the word /sa1/ in 'to grow vegetables' in sandhi position is realized as a high level tone when followed by a high checked tone /sak7′/ 'vegetable', but as a low tone when followed by a low checked tone /sak7/ 'taro'.

In sum, our research reveals the non-phrase-final position is the sandhi position in Yongxing. It also shows that despite being optional, tone alternation and neutralization as phonological rules are prominent, and that in certain environments, variable F0 of the derived forms of individual tonemes might be ascribed to an anticipatory effect. In addition, our data denote that contrastive pitch and glottalization are part of the tone package and that the phrasal structure is not positively correlated with tone alternation. With respect to future research, perception experiments are essential to shedding light on the essence of the output of tonal realizations in non-final position to see if there is complete neutralization despite production differences in tone height. Considering both pitch and voice quality to be tonal features, a more sophisticated algorithm may also be needed to extract fundamental frequency information from the audio signals that contain glottalized characteristics. An electroglottograph (EGG) study can be complementary to reveal the nature of glottalization. Future research shall also explore if there is an ongoing merger of Tone 1 and Tone 4.

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We wish to thank Xiao Aifeng and her family for their unfailing support in data collection. We are grateful to Alexis Michaud for his constructive comments on earlier versions of this paper. Thanks also go to two anonymous reviewers for their feedback and to Academia Sinica for funding this project. All errors are our own responsibility.

Abbreviations

C stop
G glide
N nasal
SG singular
T tone
V vowel

Appendix. A list of example phrases for tone sequences

Example Word/Phrase	English Gloss	Chinese Gloss
/kɔn1 kiaŋ1/	‘to eat ginger’	吃薑
/kɔn1 ŋaj2/	‘to eat cooked rice’	吃乾飯
/kɔn1 maj3/	‘to eat sugarcane’	吃甘蔗
/kɔn1 tia4/	‘to eat rice (generic)’	吃飯
/kɔn1 sak7/	‘to eat taro’	吃芋頭
/kɔn1 sak7′/	‘to eat vegetables’	吃菜
/kɔn1 mak8/	‘to eat fruit’	吃水果
/hɔ2 ɓa1/	‘to grab fish’	抓魚
/hɔ2 ŋəw2/	‘to grab yellow buffalo’	抓黃牛
/hɔ2 tɛj3/	‘to grab water buffalo’	抓水牛
/hɔ2 pʰun4/	‘to grab dog’	抓鵝
/hɔ2 ɓɔt7′/	‘to grab duck’	抓鴨子
/hɔ2 maʔ8/	‘to grab horse’	抓馬
/ka3 ɓa1/	‘to kill fish’	殺魚
/ka3 ŋəw2/	‘to kill yellow buffalo’	殺黃牛
/ka3 tɛj3/	‘to kill water buffalo’	殺水牛
/ka3 pʰun4/	‘to kill goose’	殺鵝
/ka3 ɓɔt7′/	‘to kill duck’	殺鴨子
/ka3 nok8/	‘to kill bird’	殺鳥
/tiaŋ4 ɓa1/	‘to raise fish’	養魚
/tiaŋ4 ŋəw2/	‘to raise yellow buffalo’	養黃牛
/tiaŋ4 tɛj3/	‘to raise water buffalo’	養水牛
/tiaŋ4 pʰun4/	‘to raise goose’	養鵝
/tiaŋ4 ɓɔt7′/	‘to raise duck’	養鴨子
/tiaŋ4 maʔ8/	‘to raise horses’	養馬
/ɗak7 hua1/	‘to sun-dry flower’	曬花
/ɗak7 ɓɔ2/	‘to sun-dry leaf’	曬葉子
/ɗak7 saj3/	‘to sun-dry fishing net’	曬漁網
/ɗak7 ŋaw4/	‘to sun-dry rice in the field’	曬稻子
/ɗak7 sak7/	‘to sun-dry taro’	曬芋頭
/zut7 hiat7′/	‘to burn iron’	燒鐵
/kit7′ ma1/	‘to hit dog’	打狗

Appendix. *(continued)*

/tuk7′ mɔ2/	‘to wash hand’	洗手
/tuk7′ na3/	‘to wash face’	洗臉
/kit7′ siaŋ4/	‘to hit elephant’	打大象
/tuk7′ kok7′/	‘to wash feet’	洗腳
/kit7′ maʔ8/	‘to hit horse’	打馬
/zɔk8 kɛj1/	‘to steal chicken’	偷雞
/kat8 naŋ2/	‘to tie bamboo shoots’	綁竹筍
/zɔk8 tɛj3/	‘to steal water buffalo’	偷水牛
/zɔk8 kɔw4/	‘to steal stuff’	偷東西
/zɔk8 sak7/	‘to steal taro’	偷芋頭
/zɔk8 ɓɔt7′/	‘to steal duck’	偷鴨子
/kat8 ɗak8/	‘to tie rope’	綁繩子

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台灣華語 3 至 6 歲兒童語音習得跨域研究

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語音習得研究結合語言治療應用，既可瞭解兒童習得音韻系統的發展歷程，同時也可發展自動語音評估系統，臨床用於兒童語言發展障礙及早啟動精準介入計畫。數據與標記原則的共享為此類跨域研究重要的介面。本文以口語語料庫研究方法建置兒童語音語料庫，並以機器學習模型評估自動語音篩檢系統的可行性。798 名台灣華語兒童的語音習得常模建置包含正確性標記、統計分析及建模。語音資料為念讀具音段與聲調組合平衡設計的 70 詞詞表。多層次的聽感標記涵蓋音段、聲調、音節結構與詞語等語言學單位。音節結構與音段記音採用正確性作為判斷原則；聲調及詞語則以語音型態是否能順暢的與語意連結，作為接受度標記的原則。本研究系統性報導音韻發展歷程的分齡數據，並藉由聲調自動分類器與音段學習模型的預測效能，初探台灣華語音韻體系之於主觀聽覺感知與客觀物理訊號的交互關係。運用聲調自動分類器，得以檢驗加入三聲變調與音韻環境訊息是否有助於調類分類。對照音段模型的預測效能與聽感標記結果，以音節作為語音評估單位似乎不失為一個兼顧成本及評估可信度的選擇。

關鍵詞：語音習得、聽感判斷、語音評估、口語語料庫、常模

1. 兒童語音習得研究

兒童語音習得研究多以念讀詞表錄製的語音為研究材料，依據記音結果計算各元音與輔音的正確率。與二語學習與田野調查研究方法類似，專家記音以適用該語言的音韻系統，透過音段符號記錄實際發音，並標註對比該音段系統的語音偏差。語言治療領域的應用以專家標記的音段、聲調、語暢等音韻發展指標的評估，作為介入治療的參照（Dodd et al. 2009）。因為學齡前兒童的語音習得歷程與個體差異，如何選擇合適的音段符號標記偏離標準的發音，會變得更為困難。絕對的正確性或許並非唯一可被考慮的標記原則。若回歸語言的基本功能在於理解與溝通，那麼在適度的語音變異範圍內，特別是兒童語音的評估，可接受性與可理解性似乎也可以作為評估指標（McLeod & Baker 2017）。

兒童語音習得的分齡進程必須依據經過評估或標記的語音數據才能呈現。中文兒童構音與音韻發展研究主要以聲母、元音、鼻音韻尾與聲調等音韻單位的正確率報導（Li & Thompson 1977；王南梅等 1984；張正芬、鍾玉梅 1986；林寶貴、林美秀 1994；Hua & Dodd 2000；張顯達、許碧勳 2000；卓士傑 2008；韓紹禮等 2010；鄭靜宜 2011；Yeh et al. 2015；鄭靜宜 2016）。各年齡層的音段正確率可以設定通過門檻作為區分習得的標準（Hua & Dodd 2000）。林 & 林（林寶貴、林美秀 1994）以 1992 年就讀幼兒園資料抽樣台灣北、中、南、東、台北市與高雄市等六區，共 839 名有效樣本之報導人數最多，兼具地區平衡。以其為例，台灣華語母語兒童的音段習得以 90% 為通過標準，三歲兒童習得的聲母包含 /p pʰ m n l k kʰ x tɕ tɕʰ/、四歲 /ɕ ts/、四歲半 /tʰ tsʰ/、五歲 /ʂ/、五歲半 /f tʂʰ ʐ s/ 及六歲 /tʂ/。而韻母部分，除了 /y/ 在三歲半通過以外，其餘韻母皆於三歲以前就已通過。Hua & Dodd（2000）以在北京五個幼兒園收集的一歲六個月到四歲六個月孩童，有效樣本 129 名報導聲母習得歷程。韻母部份以三元音弱化、雙元音弱化、元音取代與元音同化四類錯誤類型報導，沒有提供個別元音的正確率數據。對比台灣華語與北京普通話，北京普通話兒童於三歲前就習得擦音 /f/，而台灣華語兒童則要到五歲半，差距頗大。/ɕ/ 也類似，北京普通話兒童習得亦較台灣華語兒童早。反之，塞擦音 /tɕ/ 與 /tɕʰ/ 則是台灣華語兒童習得較早，三歲就能習得。其餘聲母的習得在兩個同樣以中文為母語的研究中，並沒有明顯差異。To 等人（To et al. 2013）報導 1726 名香港粵語母語兒童的音段習得研究：/f/ 在四歲前已經習得，與北京普通話兒童類似；塞擦音的習得年齡則與台灣華語兒童類似，相對稍晚。

過往文獻報導有關普通話、台灣華語與香港粵語聲調習得的結論大致相同。聲調的習得較個別音段為早，多在二至三歲時便已完成（Hua & Dodd 2000; To et al. 2013）。Li & Thompson（1977）的結論是台灣華語母語兒童習得「一、四聲」早於「二、三聲」。Li & Thompson（1977）在台北針對 17 名一歲半至三歲的兒童，進行了七個月有關聲調習得的觀察，可以分為四期。第一期時，「一、四聲」先被習得。在單字詞的階段，四聲對比出現後，「二、三聲」的混淆仍會出現在第二期。等到第三期，兒童進入兩字/三字階段時只會餘下部分「二、三聲」的錯誤，並開始習得連讀變調。到第四期時，「二、三聲」的習得已經完成。林 & 林（林寶貴、林美秀 1994）也報導台灣華語兒童三歲時便已習得所有聲調。三至六歲孩童，聲調正確率皆在 99% 以上；也同樣是「一、四聲」早於「二、三聲」。To 等人（To et al. 2013）報導香港粵語母語兒童在兩到三歲時已完成聲調習得。不過能否正確使用聲調或是聲調體系是否已建立完成，無法僅以個別單字詞聲

調的使用就能判定。連續語音的語句語調與整體流暢度的發展要比個別聲調來得晚。林 & 林（林寶貴、林美秀 1994）提到學前兒童的語暢與語調要到五歲才有 90% 以上的通過率，而聲調則在三歲時，即有 99% 兒童通過。個別單字的聲調尚不足以全面反映兒童聲調的習得。So & Dodd（1995）以圖片命名方式收集 57 個香港粵語詞表的語音資料和利用圖卡誘導孩童說出自發性的連續語料；並以 90% 個別聲調正確度以及 50% 的對比聲調正確度作為聲調習得的門檻。個別聲調以詞表的語音為主，連續語料用於驗證參照。對比聲調的習得則以能達到聲調與意義的對比功能為依據。

評估兒童口語能力發展與習得，語意、聲調與音段都需要被考慮（林寶貴、林美秀 1994；Hua & Dodd 2000；Wong et al. 2005；To et al. 2013）。劉等人（劉惠美等 2013）以單音節的「二、三聲」對比進行聲調區辨實驗，進一步確認學前到學齡兒童的聲調區辨敏感度與口語詞彙理解有顯著的關連性。So & Dodd（1995）以聽感正確判斷為主，對於習得的定義考量了個別聲調的正確性與有語意對比的聲調組是否能正確掌握兩種狀況。多字詞以及連續語音不僅在輔音、元音等音段層次有語音弱化、音節縮讀或連讀，在音節結構與聲調等超音段層次，也有類似的共發音現象發生。多音節詞語的聲調變異會更加明顯，而導致語音系統辨識困難（Liu et al. 1989; Wong et al. 2005）。進行多音節詞語的聽感判斷時，音段層次的共發音現象也會干擾聲調正確性的判斷。例如，Xu（1997）以中文雙音節組合的聲學分析，實證不同聲調組合的音韻環境確實會影響基頻曲線的形成方式。Wong 等人（Wong et al. 2005）錄製 13 名兩歲十個月到三歲四個月居住於美國的中文兒童以及四位成人，共 72 個單字詞，由十名經過訓練的受試者判斷調類。兒童語音保留 500Hz 以下訊號訊息，成人語音保留 400Hz 以下訊息，以避免其他語音訊號訊息干擾語意連結、影響調類的判斷。經過訓練的聆聽者僅憑部分的訊號訊息無法將包含成人的聲調語料刺激全部歸類正確。尤其是「三聲」的正確率只有 83.33%。兒童聲調正確率的實驗結果與多數研究結果的趨勢相符，「一、四聲」優於「二、三聲」；「三聲」的正確率（44.04%）遠低於「二聲」（70.19%）（Wong et al. 2005）。也就是說，僅憑聲學物理訊號的調型聽感判斷機制，有可能與語言認知處理時運用語意與其他音韻訊息辨識聲調調型的判斷機制有所不同，而導致調類聽感判斷的差異。

Peng 等人（Peng et al. 2004）使用 48 個單/雙字詞詞表進行 30 名使用電子耳的六到十二歲孩童的聲調產製與辨認研究。只有少數受試者可正確使用與辨識聲調。單字個別聲調產製正確率為「一聲」62.13%，「二聲」42.13%，「三聲」45.89%，「四聲」62.22%（Peng et al. 2004）；基本趨勢與聽常兒童的聲調發展歷程類似。但是「二聲」較「三聲」

正確率為低。聲調對比區辨則以「一、二聲」與「二、三聲」之間的對比較為困難。張等人（張小芬等 2004）採用台灣華語雙字詞進行 16 名聽障兒童與年齡性別相符之 16 名聽常兒童的聲調人耳評分研究。聲調組採平衡設計，共 15 組聲調組合為研究主體（排除「三聲」+「三聲」連讀變調組合）。所訂定的聲調判斷原則，對雙字詞個別的字調以及雙字詞的整體聲調進行 0、1、2 分的評分。評為 0 分的原則為違反該聲調主要趨勢，例如「二聲」卻具下降的調型。評為 1 分則是接近該聲調調型，但是趨勢不夠明顯。評為 2 分的，則是毫無疑問可歸類的聲調調型。張等人（張小芬等 2004）以聽感評分結果對聲調出現在雙字詞的前後位置與聲調組合之間的關連做出完整報導；對於聽障學生而言，「二聲」在前比在後困難，但是「三聲」則是在後比在前時困難。Tseng（2015）提出聽損兒童聲調區辨困難的可能是上升的調型，而並非特定調類。聽損兒童的聲調轉折過渡可能與聽常兒童相異。若聲調過渡時音節的起始音頻過高，會產生類似外國人說中文的聽感知覺。Tseng 與陳 & 陳（陳麗美、陳雅雯 2010；Tseng 2015）都提及聽損程度較為嚴重兒童的聲調調型趨向平坦。

Tseng & Liu（2021）以自動分群方法處理聽常兒童與口語清晰度高的聽損兒童語音。依據基頻曲線的自動分群結果，以最接近主要聚落中心的聲調數據點與標準聲調調型進行比較。與成人標準調型相比，聽常兒童四個聲調的起始音高都符合標準聲調的特徵。助聽器組兒童的「三聲」不符合，電子耳兒童則是「二、三聲」都不符合。以整體調型曲線而言，聽常兒童的「二聲」與成人較為不符；聽損兒童則是「二、三聲」都不符。此研究之聲學訊號計算模型結果與語言習得的專家聽感結果一致。「一、四聲」較容易習得；「二、三聲」較為困難。唯此方法僅能觀察典型調型與標準調型的整體差異，無法確認各聲調的具體變異為何。聲調是區辨語意重要的音韻特徵。不過，對於聽損或聽常兒童研究，要針對多字詞或連續語音的聲調定義與語意連結的聽感判斷原則，並不容易。

建立計算模型與發展語音科技皆需大數據語料作為研究基礎。但是兒童語音不論在語料採樣、設計及標記或記音準確度都比成人語音資料的處理困難許多。因此海量的兒童語音標記語料庫還待逐步建立。本研究以兒童語音自動評估系統為目標，結合口語語料庫與語音分析進行兒童語音習得研究，並嘗試建立機器學習模型，除了描述性分析外，也進行語音變異的探索研究。整體研究概念架構如圖 1。以詞語、音節結構及聲調的聽感標記與音段的音韻轉寫結果，做為語音計算與機器學習模型的訓練材料。以嚴格標記整理而成的台灣華語兒童語音習得常模具臨床應用參考價值。過往研究因兒童語音語料

缺乏不同層次的語言學聽感標記，無法進行語意連結與語音變異的關連研究，也無法探討標記發音變異時，應以正確性或以可接受性作為聽感判斷標準。深度學習模型可以變換模型架構以測試不同語言學層次對於自動評估模型的效能。透過詳盡的音韻轉寫資料，亦可以基礎音韻單位修正及調校語音變異，並藉由模型效能觀察語音變異狀況。本文具體以語料與模型展示領域知識與科技技術得以相輔相成的跨域研究方向。

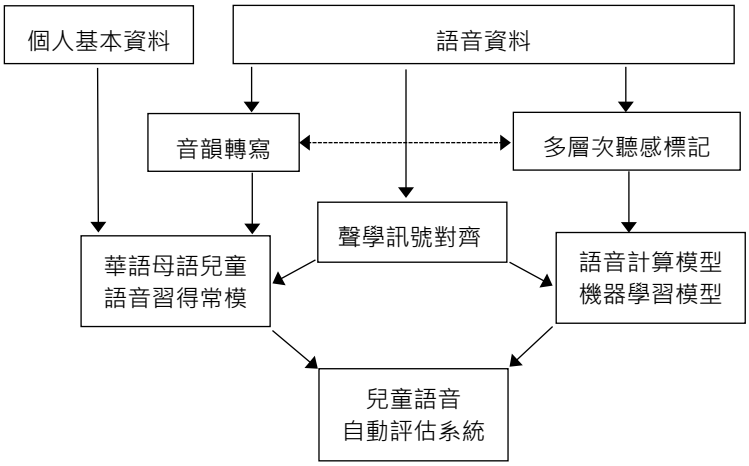


圖 1. 兒童語音習得跨域研究

2. 中研院兒童語音習得語料庫

「中研院兒童語音習得語料庫」為中央研究院語言學研究所收集 798 名新北市與台北市學齡前兒童念讀「中研院兒童語音平衡詞表」之語音資料。人數統計資料如表 1。依據園方回報，所有孩童皆無任何語言、聽力和智力發展相關疾病，雙耳皆通過 1000Hz、2000Hz 與 4000Hz，聽覺閥值 20dB 的純音聽力篩檢。「中研院兒童語音習得語料庫」於 2017 年經中央研究院人文倫理審查委員會審查通過開始執行。由園方協助收集孩童家庭照護與語言使用等個人資料及取得家長簽署之計畫知情同意書。

表 1. 中研院兒童語音習得語料庫人數統計資料

	3 歲~ 3 歲半（3）	3 歲半~ 4 歲（3.5）	4 歲~ 4 歲半（4）	4 歲半~ 5 歲（4.5）	5 歲~ 5 歲半（5）	5 歲半~ 6 歲（5.5）	6 歲~ 6 歲半（6）	6 歲半~ 7 歲（6.5）	合計
男	10	40	64	55	65	64	79	22	399
女	21	52	58	64	53	62	60	29	399

2.1 兒童語音平衡詞表

「中研院兒童語音平衡詞表」以「中研院口語詞頻表」與「中研院中文口語音節結構組合表」為基礎，參照兒童華語語音綜合測驗（鄭靜宜 2013）、華語構音/音韻臨床測驗工具（王淑慧等 2006）、國語正音檢核表（席行蕙等 2004）、構音教學活動彙編（吳咸蘭 2000）、學齡前兒童國語語音閾語詞（利文鳳 1998）與中國語音均衡字彙表（王老得、蘇富美 1979）等適用於兒童語音評估詞彙。如表 2 所列，「中研院兒童語音平衡詞表」由 62 個雙字詞組與 8 個三字詞組組成，共 148 個音節，其中 18 個音節為零聲母。所有聲母與韻母於各字詞位置至少出現一次，覆蓋所有雙音節聲調組合及多種詞語語意範疇。

表 2. 中研院兒童語音平衡詞表（Tseng 2019）

動物	食物	交通工具	身體部位	動作	物品	遊戲	地點	景觀	節日
天鵝	牛奶	火車	牙齒	吃飯	皮鞋	大富翁	花園	月亮	生日
母雞	牛排	汽車	耳朵	走路	吸管	吹泡泡	客廳	白雲	
老虎	芒果	飛機	嘴巴	爬山	玩具	足球	噴水池	斷崖	
老鷹	果汁			穿衣服	時鐘	拼圖	廚房		
兔子	草莓			掃地	茶杯	積木	學校		
刺蝟	甜甜圈			淋雨	彩色筆				
恐龍	蛋糕			游泳	窗戶				
烏龜	葡萄			買菜	鈕扣				
蜘蛛	壽司			睡覺	溫度計				
蜜蜂	熱狗			說話	筷子				
螃蟹	饅頭			寫字	電視				
醜小鴨	蘋果			騎馬	盤子				
				關燈	輪胎				

2.2 音韻特徵自動比對錯誤類型

「中研院兒童語音習得語料庫」使用 AssessingSpeech 系統建置錄音資料、個人資料及音韻轉寫結果（Tseng & Liu 2017）。系統自動比對標準音與記音結果的音韻特徵差異及計算各音段錯誤比例。聲母以發音方式、發音部位及送氣與否作為比對原則。韻母則以是否帶有介音與鼻音韻尾作為分類，進行單元音化與元音音位比對。本文礙於篇幅僅報導聲母音韻特徵的比對結果。

2.3 語料標記與處理

聽感標記以詞語、聲調與音節結構三個語言學層次進行。詞語與聲調的標記以語音形式是否能與語意順暢連結做為判斷依據。語意連結順暢且無偏差發音者，詞語標記為「正確」；語意連結順暢，但有音段或聲調發音偏差標記為「可接受」；語意連結不順暢，發音有明顯錯誤，則標記為「不正確」。聲調標記與詞語標記類似。如聲調可以順暢連結詞語的語意，聲調標為「可接受」。若聲調感知會導致語意理解不順暢，該音節聲調就標為「不可接受」。與詞語和聲調不同，音節結構的判斷以音節組成的正確性為主，不考慮語意的連結是否順暢。音段如有錯誤、掉落或插入，該音節結構為「不正確」；所有音節組成皆正確發音時則標記為「正確」。

由於音段記音耗時耗力，本研究依據詞語聽感標記結果，只有標記為「可接受」與「不正確」的詞語才進行音段記音。聲學訊號的邊界對齊以中研院語言所中文自動切音系統進行預處理。轉換為 PRAAT 格式後，標記人員再輔以視覺化的聲學訊號，進行音節邊界的人工校正（Boersma & Weenink 2022）。圖 2 為「恐龍」一詞的聽感標記與記音結果。「恐」的音節結構標記為「不正確」。對照其記音結果，/o/ 發為 /ə/。依圖 2 所示，「龍」的基頻雖然走向略微上升，或應符合「二聲」的調型，但其聲調聽感對於理解語意而言，卻被標記為「不可接受」。類似的聲調聽感歧異正是物理訊號與語意聽感連結可能不一致的例子。後續建置兒童語音計算及機器學習模型時，除了以聽感標記作為答案進行模型訓練外，也將對聽感判斷的語音評估與聲學訊號模型的語音預測做初步探討。

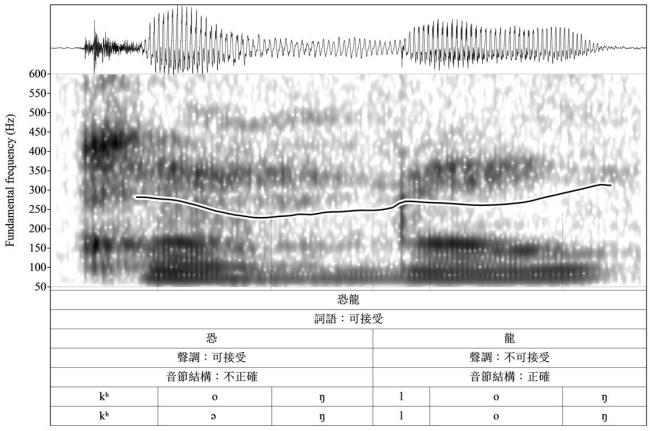


圖 2. 多層次聽感及音韻轉寫標記

3. 兒童語音習得標記及結果

兩名標記人員先以十名兒童語料進行前期訓練，確定各層次標記操作原則達到共識後，再分別標記剩餘 788 位兒童語料。兩位標記人員的標記結果經過一致性確認與討論，才確立最終標記版本。之後再由另一名具備語音標記經驗的記音人員對被標記為「不可接受」與「不正確」的詞語，進行音段的音韻轉寫。本研究採用的華語音段音韻系統包含聲母（C）/p pʰ t tʰ k kʰ f s ʂ ç x ʐ ts tsʰ tʂ tʂʰ tç tçʰ m n l/；韻母則細分為介音（G）/j w/，元音（V）/i ɨ ɯ u y a o ə e ɚ ai ei au ou ye/ 以及鼻音韻尾（N）/n ŋ/。進行音韻轉寫時，若無對應的台灣華語音韻系統音段符號時，記為「扭曲」；有贅加或刪減的音段則以「添加」及「省略」分別表示，皆不另做音韻轉寫。

3.1 聽感標記結果

詞語、聲調及音節結構標記結果統計列於表 3 至 6。以語意連結及發音偏差程度作為聽感判斷依據（表 3），區分三類標記時，詞語聽感標記一致率為 80%，kappa 值為 0.5；若不考慮「可接受」標記，kappa 值為 0.75。整體而言，標記為「正確」與「可接受」的比例極高，低 kappa 值主要來自於極低比例的「不可接受」標記。如表 4 所示，1444 個詞語標記結果相互衝突（以粗體字標示），意即一名標記人員標為「正確」，另一名標記為「不正確」。兩名標記人員與本文作者在逐一討論後，方確定最後聽感判斷標記。若

非「正確–不正確」此類相互衝突標記，則批次選擇記錄較多發音偏差的判斷為最終版本，如「正確–可接受」採「可接受」、「可接受–不正確」採「不正確」。聲調與音節結構的最終標記定版流程亦同，意即任一標記人員判斷有發音偏誤者，即採用該標記。依據表 5 結果，多數聲調調型已可以不影響語意判斷的清晰程度習得。表 6 顯示以音節的音段組成正確性做為判斷基礎的「正確」音節比例明顯較標記「可接受」的聲調比例來的低。

表 3. 聽感標記一致性比較

	Cohen's kappa	標記一致
全部詞語	0.535	80.9%
排除「可接受」詞語	0.757	96.5%
字 1 聲調	0.369	98.1%
字 2 聲調	0.464	98.5%
字 3 聲調	0.447	98.8%
字 1 音節結構	0.597	89.9%
字 2 音節結構	0.635	92.0%
字 3 音節結構	0.623	92.1%

表 4. 詞語聽感標記結果

	不正確	可接受	正確	合計
不正確	2497	1010	**607**	4114
可接受	1075	5529	2414	9018
正確	**837**	4739	37152	42728
合計	4409	11278	40173	55860

表 5. 聲調聽感標記結果

字 1	不可接受	可接受	合計	字 2	不可接受	可接受	合計	字 3	不可接受	可接受	合計
不可接受	329	720	1049	不可接受	386	456	842	不可接受	31	47	78
可接受	361	54450	54811	可接受	409	54609	55018	可接受	28	6278	6306
合計	690	55170	55860	合計	795	55065	55860	合計	59	6325	6384

表 6. 音節結構聽感標記結果

字 1	不正確	正確	合計	字 2	不正確	正確	合計	字 3	不正確	正確	合計
不正確	5342	1813	7155	不正確	4733	1458	6191	不正確	510	213	723
正確	3822	44883	48705	正確	2998	46671	49669	正確	294	5367	5661
合計	9164	46696	55860	合計	7731	48129	55860	合計	804	5580	6384

3.2 詞語、聲調與音節結構分齡習得歷程

本節報導兒童語音習得的分齡歷程。以圖 3 詞語正確率而言，3 歲兒童約有 20% 左右的詞語發音與語意連結不順暢，口語溝通時有可能會造成聽者的理解困難。隨年齡增長，到 6 歲左右，多數詞語的發音都可以被理解無誤，僅有少數不妨礙語意理解的語音偏誤。但若以正確性審視，即便是 6 歲兒童，也僅有 80% 的詞語發音完整無誤。可見詞語的發音正確性與語意理解的可接受性確有分開檢視的必要。

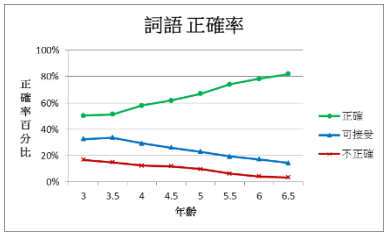
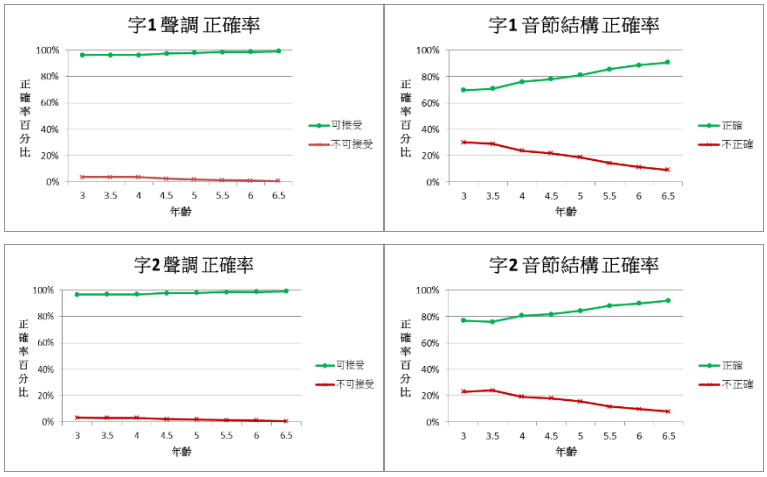


圖 3. 詞語聽感標記分齡數據

聲調習得確如前人研究，3 歲兒童幾乎都已習得聲調，可接受率平均為 98%。音節結構習得則有明顯差異，整體數據整理於圖 4。音節結構的發音，正確率平均為 83%。3 歲到 6 歲兒童的聲調可接受度由 97% 增加到 99%，音節結構正確度則由 73% 增加到 91%。由於詞表尚無音節結構的平衡設計，目前還無法細究何種音節結構與音段序列組成較易導致錯誤發音。



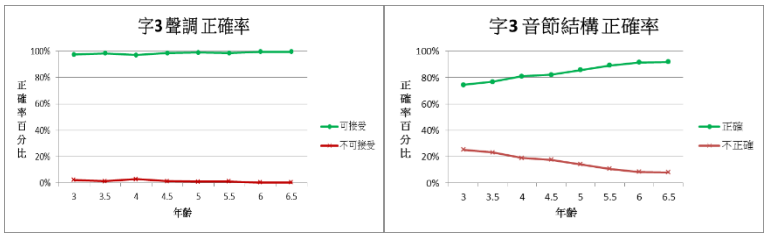


圖 4. 聲調與音節結構聽感標記分齡數據

3.3 音段記音

詞語標記為「正確」者，其記音結果即以標準音段序列自動轉換。18694 個被標記為「不正確」或「可接受」的詞語則進行第二階段的音段記音。記音人員使用 PRAAT 提供之聲學訊號及視覺輔助進行音韻轉寫。表 7 為以 798 名兒童音段分齡習得歷程數據。以 90% 為通過門檻，個別音段的習得年齡以粗體字標示。以個別語者為單位，各年齡層的聲母與韻母正確率相去不遠。但若審視各音段的習得歷程，聲母與韻母之間的分布則各有不同。

表 7. 音段分齡習得歷程（正確率達 90% 以灰階標示）

年齡	3	3.5	4	4.5	5	5.5	6	6.5
聲母正確率	82.7%	82.1%	85.1%	86.1%	88.5%	91.1%	92.9%	94.2%
韻母正確率	84.1%	81.2%	85.2%	86.0%	88.6%	91.7%	92.7%	94.5%
zero onset	99.5%	99.6%	99.5%	99.2%	99.5%	99.6%	99.9%	100%
p	**98.4%**	97.6%	98.4%	98.9%	98.9%	99.4%	99.8%	99.0%
t	**96.8%**	96.1%	95.2%	95.0%	95.4%	98.5%	98.7%	99.5%
k	87.1%	86.4%	**93.6%**	93.6%	93.9%	96.6%	97.0%	99.0%
p^h	88.9%	**93.5%**	92.9%	93.1%	95.0%	95.1%	96.5%	96.8%
t^h	86.4%	**92.0%**	93.5%	93.7%	94.8%	98.0%	98.2%	98.9%
k^h	81.5%	84.8%	**90.2%**	91.8%	93.0%	96.4%	96.8%	98.0%
f	88.7%	88.2%	**94.7%**	90.2%	94.9%	96.0%	98.9%	99.3%
s	89.2%	82.2%	85.8%	85.7%	**90.7%**	91.0%	94.2%	94.1%
ʂ	41.9%	39.1%	46.7%	51.7%	57.3%	63.3%	68.8%	77.0%
ɕ	86.2%	84.6%	89.8%	89.8%	**92.1%**	95.4%	97.8%	97.2%
x	90.3%	85.0%	86.9%	**90.3%**	90.0%	91.6%	96.0%	94.9%
ʐ	41.9%	32.6%	42.6%	49.2%	52.5%	59.1%	65.1%	71.6%
ts	88.0%	82.3%	87.0%	85.4%	**91.5%**	92.2%	93.9%	95.0%
ts^h	86.3%	84.0%	86.9%	84.7%	**91.1%**	92.5%	95.5%	95.6%
tʂ	46.0%	32.6%	44.3%	50.2%	55.5%	63.3%	66.5%	77.0%
$tʂ^h$	40.2%	38.8%	48.1%	51.3%	57.9%	66.8%	71.9%	72.9%

續上表

tɕ	**95.2%**	95.8%	95.2%	96.4%	98.2%	98.3%	99.2%	99.0%
tɕ^{h}	86.3%	90.2%	87.9%	**91.2%**	93.6%	95.8%	97.3%	98.5%
m	**96.8%**	96.1%	95.0%	98.4%	97.7%	98.3%	98.7%	98.3%
n	**91.9%**	90.8%	93.2%	94.1%	94.5%	96.4%	97.1%	99.5%
l	84.8%	87.1%	86.7%	89.3%	**91.8%**	95.6%	96.2%	98.9%
n（coda）	78.6%	72.6%	82.2%	79.8%	83.4%	**92.3%**	93.2%	96.4%
ŋ	69.4%	62.6%	73.4%	72.7%	76.9%	86.5%	87.0%	**92.5%**
zero coda	99.7%	99.9%	100%	100%	100%	100%	100%	100%
j	98.5%	97.5%	97.9%	98.1%	98.3%	98.8%	98.9%	99.6%
w	97.5%	95.6%	95.9%	97.1%	98.2%	98.2%	98.5%	99.6%
zero glide	99.3%	99.5%	99.4%	99.5%	99.6%	99.6%	99.6%	99.7%
a	97.3%	95.6%	96.4%	96.4%	97.7%	98.9%	98.5%	99.2%
ai	91.8%	92.6%	95.8%	93.7%	97.2%	96.0%	98.4%	98.0%
ao	86.8%	82.3%	85.4%	86.2%	90.5%	92.8%	94.3%	91.4%
e	100%	98.1%	98.1%	99.6%	99.2%	99.4%	99.9%	100%
ə	97.8%	94.4%	95.8%	96.2%	96.8%	98.7%	98.7%	99.3%
ɚ	6.5%	10.9%	20.5%	19.3%	24.6%	27.0%	33.8%	49.0%
ei	98.2%	98.3%	99.2%	99.2%	99.4%	99.4%	99.5%	100%
i	97.9%	98.4%	99.2%	99.3%	99.5%	99.5%	99.9%	99.9%
ɨ	91.9%	87.7%	94.1%	93.0%	95.9%	96.3%	95.9%	97.4%
ɯ	41.9%	35.5%	45.9%	50.9%	60.2%	64.7%	68.2%	76.2%
o	79.0%	75.3%	75.2%	79.4%	82.0%	84.2%	84.3%	85.8%
ou	83.9%	83.0%	85.7%	87.7%	89.7%	92.9%	93.9%	94.1%
u	94.8%	94.6%	94.0%	96.2%	95.9%	96.4%	96.5%	97.7%
y	87.1%	92.0%	93.4%	93.3%	96.3%	96.8%	98.8%	99.3%
ye	89.5%	87.8%	88.1%	91.2%	93.9%	96.2%	97.5%	99.5%

以表 7 的 90% 作為通過門檻，表 8 整理列出本研究的音段習得結果與 Hua & Dodd（2000）的北京普通話與林 & 林（林寶貴、林美秀 1994）及卓（卓士傑 2008）的台灣華語研究結果。四個研究的共同點是 3 歲左右 /p m n/ 已經習得；塞音的習得以雙唇音 /p/ 為最早；/tɕ/ 的習得則是台灣華語較北京普通話為早。塞音的習得順序略有不同，但都一致是不送氣早於送氣。台灣華語與北京普通話共同的是 /f/ 的習得要早於/s/，但在台灣華語習得的年齡較晚，大約落在 5 歲左右。捲舌音相對一致，都屬較晚習得的聲母。本研究也列出鼻音韻尾的記音結果，/n/ 韻尾在 5 歲半習得；/ŋ/ 則是六歲半。以正確率而言比聲母要來得晚，但是主要原因有可能在於閉音節的韻尾脫落，而非無法正確發音。

表 8. 音段習得歷程比較

	本研究 2024	林 & 林 1994	Hua & Dodd 2000	卓 2008
3~3.5（含以前）	p t tɕ m n	p pʰ m n l k kʰ x tɕ tɕʰ	p t k tʰ kʰ f ɕ x m n	p t tʰ k kʰ x m ʐ l
3.5～4	pʰ tʰ	t	pʰ	n tɕ
4～4.5	k kʰ f	ɕ ts	s ʐ tɕ tɕʰ l	pʰ tʂʰ
4.5～5	x tɕʰ	tʰ tsʰ	ʂ ts tsʰ tʂ tʂʰ	f tɕʰ ts tsʰ
5～5.5	s ɕ ts tsʰ l	ʂ		ɕ s
5.5～6	n（coda）	f tʂʰ ʐ s		ʂ tʂ
6～6.5		tʂ		
6.5～7	ŋ			
7 以後	ʂ ʐ tʂ tʂʰ			

4. 錯誤類型分析

4.1 聲母及音境同化錯誤類型

798 名兒童的聲母記音結果統計列於表 9。「省略」、「扭曲」及「添加」以 O、D、I 表示，個數分別為 1105、434 及 25。若為零聲母 ϕ 音節，表 9 以實際發音之記音結果表示，不會計入「添加」的計算。「省略」聲母的發音為數不少，各類聲母都會發生，較常發生於 /x k l n m pʰ/。若無法以台灣華語音韻符號轉寫者，標記為「扭曲」，其出現的音韻環境各異；「添加」音段個數不多，較常發生於 /f/ 與 /l/ 環境。

表 9. 聲母記音結果統計

		記音結果																								
		O	D	I	ϕ	p	t	k	pʰ	tʰ	kʰ	f	s	ʂ	ɕ	x	ʐ	ts	tsʰ	tʂ	tʂʰ	tɕ	tɕʰ	m	n	l	總計
標準音段	ϕ		1		14305		1	5				1				1	15							9	1	25	14364
	p	14	6	1		3157	1		10															2		1	3192
	t	42	8			6	6178	58	1	28							1	7		5		31	1		3	15	6384
	k	160	1			12	181	6000	1		20		1			1		7									6384
	pʰ	65	11			374	4	2	8285	12	3	2				15							2	3			8778
	tʰ	18	15			2	120	9	17	6835	91				2	4		3	5			5	51		2	4	7183
	kʰ	29	7				2	57	2	114	2953					26			1							1	3192
	f	26	36	9		71	3	2	34			4516	1			81		5			1			2		1	4788
	s	1	14				25	10		14	2		2132	103	6			48	30	3	3	1	1			1	2394
	ʂ	11	54	1		3	49	25	1	26	4	6	2205	3598	7	2	2	224	114	20	14	4	12			2	6384

續上表

		記音結果																									
		O	D	I	ɸ	p	t	k	pʰ	tʰ	kʰ	f	s	ʂ	ɕ	x	ʐ	ts	tsʰ	tʂ	tʂʰ	tɕ	tɕʰ	m	n	l	總計
標準音段	ɕ	15	32	1			3	9	3	10	4	1	30	5	5148	4		9	11	1		167	133				5586
	x	249	12	1			1	21	2	1	63	22				3614			1							2	3989
	ʐ	46	18	2			19	2		1							834	2		2					1	669	1596
	ts	30	60	2		1	120	18	1	9	1		19	2				4998	44	215	2	63	1			1	5587
	tsʰ		10	1			7		5	110	10	1	16	1		2		57	2865	7	78	4	18				3192
	tʂ	2	32				68	15	1	2			11	1			1	1276	18	1740		21	3			1	3192
	tʂʰ	18	31	2			22	3	2	365	33	2	60	21	1	12		284	2806	31	5033	2	50				8778
	tɕ	8	13				22	16		7	2				10			6		1		4659	44				4788
	tɕʰ	1	8				2	3	1	40	12				34	3			9		3	107	2969				3192
	m	90	28	2		24	1		4	1						4								6222	7	1	6384
	n	127	4				5		1															3	3026	26	3192
	l	153	33	3		4	157	4	1	6						2	50	5		1				4	44	5118	5585

聲母錯誤類型以三個向度的音韻特徵分類，按照發音方式、發音位置及送氣與否依序歸類。依據 AssessingSpeech 的比對結果，共有 3199 個聲母發音方式錯誤，常見類型依序為塞音化、邊音化及塞擦音化。發音方式正確，但位置錯誤者共有 7147 個；除去佔大多數的應捲舌而未捲舌及不應捲舌而捲舌外，常見的錯誤類型依序為齒音化及舌根音化。發音方式及位置皆正確，僅有送氣與否錯誤者共 808 個；其中 672 個應送氣而未送氣，其餘則為不應送氣但記音結果為送氣。

音境同化錯誤分為 367 個逆向同化與 91 個順向同化。大致均勻分布於各年齡層。為數最多的音境同化發生於「壽司」，應與 /ʂ/-/s/ 捲舌音音韻環境有關，逆向同化的原因也與 /ʂ/ 的非捲舌化相關。其餘常見的音境同化則多發生於 /kʰ/-/tʰ/、/k/-/t/ 或 /t/-/k/ 音韻環境，如「客廳」、「關燈」與「蛋糕」。表 10 所列的常見音境同化錯誤，除了聲母同化之外，也經常伴隨鼻音韻尾的掉落及複元音的單元音化。

表 10. 常見雙音節詞音境同化錯誤

逆向同化	次數	常見錯誤	順向同化	次數	常見錯誤
壽司 ʂou sɨ	319	ʂou→sou, sao	壽司 ʂou sɨ	36	sɨ→ʂɯ, ʂɨ
客廳 kʰə tʰiŋ	28	kʰə→tʰə	蛋糕 tan kao	28	kao→tao, ta
關燈 kwan təŋ	22	kwan→twan, twa	關燈 kwan təŋ	7	təŋ→kəŋ, kən
掃地 sao ti	13	sao→tao, ta	客廳 kʰə tʰiŋ	3	tʰiŋ→kʰi, kʰiŋ

4.2 聲調錯誤分析

各年齡層聲調可接受率的差異並不大。由表 11 所列 798 名兒童的聲調標記結果可知，「二、三聲」及「輕聲」的錯誤略高於「一、四聲」。此與前人研究一致。但「二聲」的習得似乎要比「三聲」略晚。

表 11. 各聲調「可接受」標記比例

年齡層	一聲	二聲	三聲	四聲	輕聲	平均
3	98.2%	93.3%	96.6%	98.1%	95.7%	96.4%
3.5	98.3%	93.9%	96.2%	98.4%	96.4%	96.6%
4	98.0%	94.4%	96.1%	98.0%	97.0%	96.7%
4.5	98.8%	95.6%	97.4%	98.9%	98.9%	97.9%
5	99.0%	96.1%	98.0%	99.4%	97.5%	98.0%
5.5	99.2%	97.8%	98.4%	99.0%	97.9%	98.5%
6	99.3%	98.1%	98.8%	99.4%	98.8%	98.9%
6.5	99.9%	98.4%	99.2%	99.5%	100.0%	99.4%
平均	98.8%	96.0%	97.6%	98.8%	97.8%	97.8%

雙音節聲調組合被標記為無法與語意順暢連結的比例列於表 12。不論首或末音節，與「二聲」或「三聲」的聲調組合，「不可接受」的比例都高於與「一聲」或「四聲」的組合。特別是三聲連讀變調並非錯誤率最高的聲調組合。以聲調與詞語語意連結的順暢與否而言，兒童習得連讀變調的語音形式並沒有造成直接的困難。反而與「二聲」相關的組合錯誤率比「三聲」相關組合來的更高。「二聲」位於末音節的聲調組合又比位於首音節的錯誤率高，特別是「三聲」＋「二聲」組合。上升調位於末音節的較高錯誤率在各年齡層都可觀察到。

表 12. 雙音節詞聲調錯誤

	第二音節									
第一音節	3	一聲	二聲	三聲	四聲	5	一聲	二聲	三聲	四聲
	一聲	1%	8%	5%	3%	一聲	1%	6%	3%	1%
	二聲	6%	7%	3%	3%	二聲	2%	4%	2%	1%
	三聲	2%	8%	2%	2%	三聲	2%	4%	0	2%
	四聲	1%	2%	2%	3%	四聲	1%	2%	0	1%
	3.5	一聲	二聲	三聲	四聲	5.5	一聲	二聲	三聲	四聲
	一聲	2%	6%	4%	3%	一聲	1%	4%	1%	1%
	二聲	4%	6%	4%	4%	二聲	1%	1%	2%	1%
	三聲	2%	11%	4%	2%	三聲	1%	3%	1%	2%
	四聲	2%	2%	3%	2%	四聲	0	1%	1%	1%

續上表

	第二音節									
第一音節	4	一聲	二聲	三聲	四聲	6	一聲	二聲	三聲	四聲
	一聲	2%	7%	2%	2%	一聲	1%	4%	2%	1%
	二聲	2%	5%	5%	4%	二聲	1%	1%	2%	1%
	三聲	2%	10%	4%	4%	三聲	1%	3%	1%	1%
	四聲	1%	3%	3%	2%	四聲	1%	0	1%	1%
	4.5	一聲	二聲	三聲	四聲	6.5	一聲	二聲	三聲	四聲
	一聲	1%	6%	2%	2%	一聲	0	2%	0	0
	二聲	1%	4%	3%	3%	二聲	0	1%	2%	2%
	三聲	2%	5%	1%	2%	三聲	0	1%	1%	1%
	四聲	2%	3%	2%	1%	四聲	0	0	0	0

5. 兒童語音自動評估研究

隨著現代語音科技發展，自然口語的語音變異是口語理解研究高度關注的議題。但處理語音變異需要大量的資料作為實證基礎。藉由領域專家的聽感評估與科技自動化的結合，一方面可以獲取一致性高的基礎研究材料。另一方面則有助於串接研究與應用的合作介面。在現今各領域積極建置智慧系統的時代，除了基礎技術的研發之外，領域知識與實際應用的連結也是跨域研究合作的重點。機器學習模型以統計計算推導巨量資料內部特性。以監督式學習為例，對具有標註的資料進行模型分析和學習，再以新資料進行相同任務的預測。機器學習模型可處理數量大且具複雜特徵的資料集。本節嘗試以機器學習模型進行聲調變異以及音段預測的初步實驗；使用上述經過聽感標記的標註資料作為訓練及測試資料集。除了初探兒童語音的變異之外，也試探建立兒童語音自動評估系統的可能性。模型本身效能的優化則非本文主要目的。

5.1 建立基礎聲調調類自動分類器

同一調類的實際調型表現會因語境不同而有所變化。聆聽者透過自身構築的音韻體系，將所接收的語音物理訊號，串接語意以解讀被遞送的訊息內容。因為語境造成的調型變異，在處理單字詞與多字詞或連續語流時，解讀物理訊號與對應調類的機制可能有所不同。自動偵測聲調調類是否為「標準聲調」，在兒童習得與成人外語習得領域也是近年機

器學習研究致力的方向之一（Liu et al. 1989; Chen & Wang 1995; Xu 1997; Wang et al. 2008; Chen et al. 2016; Li et al. 2016; Chan 2020; Qin et al. 2020）。但是，以「標準聲調」為正確答案是否合適，是否應該與母語者的「聽感相符」才是系統應該追求的正確答案？本研究嘗試透過多層次的人工標記以及機器學習模型先對聽感與訊號之間的差異進行研究。類似母語者以口語習得學習調類體系的機制，模型以基頻作為主要輸入的聲學訊號訊息，藉以學習各調類的自動分類器。本研究重點在試探兒童語音習得跨域研究的可能性，因此僅以基頻進行模型建置，暫不考慮其他聲學參數如音長、音強及音質。為觀察三聲變調的變化及音韻環境對聲調調型的分類是否具影響力，共建立四種聲調自動分類器作為比較。

聲調聽感標記為「可接受」之音節即表示該聲調調型與標準體的聲調調類可以順暢的進行語意串接。因此實驗語料排除聲調標記為「不可接受」音節，也排除輕聲音節，如「饅頭」的「頭」、「耳朵」的「朵」與「嘴巴」的「巴」及聲檔異常共 5340 個音節資料。依據圖 2 所示的聲學訊號對齊訊息，以 PRAAT 抽取該音節的基頻（F0）值，再以隨機森林進行調類分類實驗。使用 1000 棵決策樹（estimators）設定；訓練資料為 90211 個音節，測試資料為 22553 個音節。四種模型分別為（1）特徵集僅為 F0 值，四聲加輕聲共 5 個調類，（2）特徵集僅為 F0 值，四聲、輕聲加三聲變調，共 6 個調類，（3）特徵集為 F0 值及後接字調類，5 個調類，（4）特徵集為 F0 值及後接字調類，6 個調類。模型效能整理於表 13。

表 13. 聲調自動分類模型效能

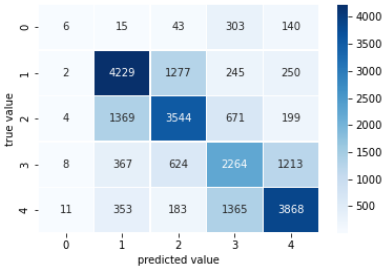
（1）F0	精準率	召回率	F1	總數	（2）F0	精準率	召回率	F1	總數
輕聲	0.19	0.01	0.02	507	輕聲	0.19	0.01	0.02	507
一聲	0.67	0.7	0.69	6003	一聲	0.66	0.7	0.68	6003
二聲	0.62	0.61	0.62	5787	二聲	0.62	0.61	0.62	5787
三聲	0.47	0.51	0.49	4476	三聲	0.47	0.53	0.5	4154
四聲	0.68	0.67	0.68	5780	四聲	0.68	0.67	0.67	5780
					三聲變調	0.09	0	0.01	322
正確率			0.62	22553	正確率			0.61	22553
加權平均	0.61	0.62	0.61	22553	加權平均	0.60	0.61	0.60	22553

續上表

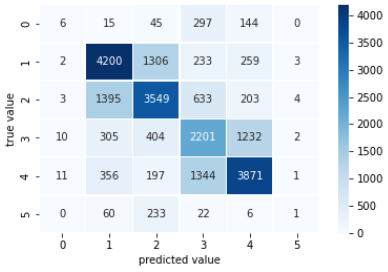
（3）F0＋後接字調	精準率	召回率	F1	總數	（4）F0＋後接字調	精準率	召回率	F1	總數
輕聲	0.36	0.04	0.07	507	輕聲	0.34	0.04	0.07	507
一聲	0.71	0.76	0.74	6003	一聲	0.71	0.77	0.74	6003
二聲	0.7	0.67	0.68	5787	二聲	0.7	0.67	0.68	5787
三聲	0.62	0.5	0.55	4476	三聲	0.62	0.53	0.57	4154
四聲	0.65	0.78	0.71	5780	四聲	0.65	0.78	0.71	5780
					三聲變調	0.64	0.07	0.12	322
正確率			0.67	22553	正確率			0.68	22553
加權平均	0.67	0.67	0.66	22553	加權平均	0.67	0.68	0.66	22553

加入後接字調類的音韻環境訊息，模型效能確實有略微提升。聲調分類的實驗結果支持，語境相關的可能預期考量有助於聲調的預測。不論模型只使用基頻訊息或加入後接字調訊息，「一、四聲」的預測效能都優於「二、三聲」。此結果與前人依據專家聽感判斷報導的兒童聲調習得研究相同（Li & Thompson 1977）。也說明了兒童習得語音時，來自聲學訊號的訊息本身的混淆狀況與兒童實際產製的語音型態的錯誤混淆，在某種程度上是相對應的。四個聲調中，「三聲」的模型預測效果最差。加入後接字調類訊息，「三聲」的預測效能雖有提高，但仍是預測結果最差的調類。表 11 的聽感標記結果是「二聲」的錯誤率比「三聲」略高。但模型預測「三聲」的效能明顯低於「二聲」。即便將「三聲變調」獨立自成一個調類（模型 2 與 4），整體預測效能依然沒有明顯改善。為比較各聲調混淆狀況，圖 5 列出模型預測調類與標準調類的混淆矩陣。

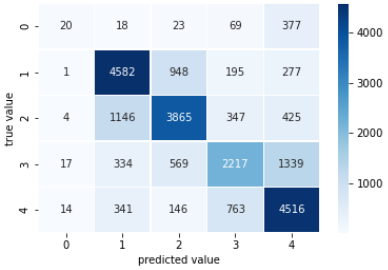
一、F0；5 調類



二、F0；6 調類



三、F0+後接字調；5 調類



四、F0+後接字調；6 調類

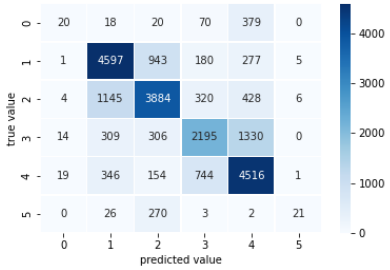


圖 5. 聲調分類器混淆矩陣
（true value：正確調類，predicted value 為模型預測調類；「輕聲」以 0 表示，1、2、3、4、5 分別表示「一、二、三、四聲」及「三聲變調」）

聲調所在的音韻環境會影響調類的偵測。以模型 1 為例，前字為「四聲」的「一聲」，經常被分類為「二聲」;「二聲」後接「一、四聲」的分類為「一聲」。與連讀變調相關的「三聲」，若後接「一、二、四聲」多預測為「四聲」；但若後接「三聲」則多為「二聲」。前字為「二聲」的「三聲」經常被預測為「四聲」，應是「三聲」發為「半上」的結果。基本上，這些趨勢與已知的聲調音韻變化以及聲調過渡的共發音現象相符。以聲學特徵建立的學習模型確實某種程度能反應聲調調型的特性。此外，「一聲」調型較易與「二聲」混淆，「三聲」易與「四聲」混淆。「一、二聲」的混淆推測與上升調型不明顯有關。「三、四聲」的混淆則與「三聲」在非連讀變調環境裡多為下降調的「半上」有關。模型 2 與 4 的「三聲變調」多被分類為「二聲」。增加「三聲變調」調類的模型預測，僅是將原本「三聲」被分類為「二聲」的錯誤移至新增的「三聲變調」調類所預測的「二聲」。可見連讀變調的三聲，聲學訊號可預測性高。其餘各調類的四個模型預測結果分布則大致相同。「三聲」之所以預測效能比「二聲」差，原因也在於「三聲」有標準「三聲」，「半上」及「三聲變調」三種型態。與前述聲調的聽感標記結果是「二聲」錯誤較多，略有不同。聽感解讀語意的調類與聲學訊號傳遞的調型之間的差異涉及語言認知體系的運作機制以及聲學訊號對應詞意理解的門檻值設定。是否有母語者群體適用的門檻，可作為模型系統學習的目標，又或是個別語者各有其自定門檻，目前尚不得而知。後續優化模型與增加聽損兒童語料後，可進一步以不同的模型設定，測試不同的理論假設。

5.2 音段學習模型

自動語音評估系統可應用於輔助語言治療的臨床診斷。以深度學習模型而言，近年已有卷積神經網絡學習模型對帕金森患者和健康者進行構音類型分類以及建立帕金森患者的構音障礙程度自動評估系統及失語症患者的自動語音評估模型（Vásquez-Correa et al. 2017; Vásquez-Correa et al. 2018; Qin et al. 2020）以及深度模型所建立的音段錯誤模型（Lee & Glass 2015; Lee et al. 2016; Smith et al. 2017）。本研究嘗試使用一層卷積神經網路建立四個音節音段位置（C、G、V、N）的音節結構學習模型。輸入的聲學訊號以音節為單位，使用 40 維度的靜態梅爾頻率倒譜係數。輸出則是記音結果 C、G、V、N 的類別預測，為多輸出結構，共享同一個卷積神經網路權重。

模型結構包含二維卷積層，64 個 3x3 的卷積核在輸入資料上進行滑動卷積擷取特徵運算。同一卷積核共享權重可有效降低參數量。模型使用池化層以降低參數量級與緩解卷積層對位置的敏感度，在框選的局部數值中挑出最大值。並以正則化技術降低過擬合問題，提升預測精準度。平坦層將卷積層與池化層輸出的特徵展開成一維矩陣，以進行全連接層做分類。使用 4 組二層的全連接層分別處理 C、G、V、N 的輸出。第一層有 32 個神經元，第二層則依據 CGVN 各音段位置的類別數量設定編碼維度。例如，聲母位置共有 21 個聲母、零聲母及省略、扭曲與添加共 25 類記音結果，便使用 25 個神經元。訓練模型使用 80% 的常模資料（共 118104 音節）；測試模型效能使用 20% 的常模資料，共 23621 音節。表 14 為各音段位置的模型預測效能。以正確率而言，類別數量較少的 G 與 N 音段位置表現都達到.85；聲母與元音也有七成左右。此模型後續可再以成人資料及聽損兒童調整優化。

表 14. CGVN 音段自動分類預測模型效能

	類別	正確率	F1
C	21 聲母、ϕ、O、D、I（25）	0.688	0.686
G	2 介音、ϕ、O、D、I（6）	0.920	0.916
V	15 元音、D（16）	0.764	0.760
N	2 鼻音韻尾、ϕ、O、D、I（6）	0.850	0.841
平均		0.805	0.801

/f/ 的習得年齡在表 8 所整理的分齡習得數據中，各研究的結論相差甚多。原因有可能是語料選擇、記音原則、人數限制等因素造成。以 /f/ 為例，表 15 列出 /f/ 的記音結果與音段模型的預測結果。模型預測的音段與人工記音相符者約為 90%（以網底標示）。被記為 /f/ 者，且音段模型亦辨識為 /f/ 者共有 4117 個。其餘約四百個被記為 /f/ 者，模型預測的音段結果變異性很大，幾乎涵蓋所有聲母。音段模型以聲學訊號作為輸入訊息，所預測的結果直接反映該語音所攜帶的物理訊號內容。表 15 的結果明確顯示，聲學訊號攜帶的訊息與人工記音的判斷結果，確實存在一定程度的混淆。

表 15. 音韻轉寫與模型預測比較：以 /f/ 為例

人工記音結果 \ CGVN 模型預測音段	ɸ	O	D	I	f	p	t	k	pʰ	tʰ	kʰ	s	ʂ	ɕ	x	ts	tsʰ	tʂ	tʂʰ	tɕ	tɕʰ	m	n	l	總計
f	40	7	4		4117	36	14	16	21	10	3	34	32	4	18	18	13	30	5	3	1	25	55	10	4516
O		19						3							2	1						1			26
D	3	5	3		8	1		4	1	2			1		2	1			1			2		2	36
I	1			1	1						1				5										9
p	2	2			3	41	14	1	7													1			71
t							3																		3
k							1	1																	2
pʰ			1		2				27	2					1		1								34
s															1										1
x	3	2	2		3			3	1	1	1	1			64										81
ts																4		1							5
tʂʰ																			1						1
m																						2			2
l																								1	1
總計	60	24	10	1	4134	78	32	28	57	15	5	35	33	4	93	24	14	31	7	3	1	31	55	13	4788

若將語音評估的處理單位設定為音節而非音段，自動語音評估系統的可行性又會是如何？以音節結構的正確性標記作為音節單位的評估答案，對比以記音結果與以 CGVN 模型預測結果的音節正確性，可檢驗自動語音評估系統以「音節」為單位的可能性。若模型預測值與標準音相符則音節結構為「正確」；反之為「不正確」。表 16 列出人工記音結果與 CGVN 模型，兩種驗證方法的結果。如設定評估標的是音節正確性，專家聽感標記與耗費人力的音段音韻轉寫所達到的評估目標很接近。正確率可達到九成以上。人工記音與音節結構聽感判斷的評估結果類似。所耗費的人力成本則大不相同。作為兒童語音早期篩檢工具，「音節」似乎是一個具可信度，又易於操作的單位。

但以目前嘗試建置的 CGVN 模型所預測的音節正確率，則僅達到六成左右，尚不及人工記音的效能。因為本研究使用的皆為聽力、發展正常兒童語音，語音不正確的比例偏低，模型尚缺乏足量的此類訓練資料。未來若加入聽損兒童或 3 歲以前兒童的資料，

預期可進一步增強 CGVN 模型的效能。屆時亦可測試以本研究產出的「詞語」與「音節」的聽感標記建立較大語音音韻單位的預測模型，例如「詞語」與「音節」正確性的自動評分系統。

表 16. 以音段標記預測音節正確性之效能

	總數	正確率	F1
人工記音的音段序列	118104	0.929	0.930
CGVN 模型預測的音段序列	23621	0.599	0.646

6. 結語

建立計算模型與發展語音科技必須有大數據語料作為研究基礎，但是兒童語音比成人語音資料的處理困難許多。本文展示結合口語語料庫研究方法與兒童語音習得研究，以台灣華語兒童語音自動評估系統作為語言治療臨床評估應用的目標。同步完備語音習得數據與標記語料以及建立兒童語音聲調及音段預測模型。隨著現代語音科技快速發展，領域知識與實際應用的連結是各領域發展的重要關鍵。就兒童語音習得研究而言，標註的語音語料是研究與應用結合最直接的介面。本研究報導 3 至 6 歲兒童資料，若能擴及 3 歲以下及聽損兒童，可望能為早療及聽損兒童領域開發正確性高的語音自動篩檢系統及相應的教學輔助工具；亦能為語音習得研究建置可貴的研究資料。

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Corpus-based research on speech acquisition and automatic assessment of Taiwan Mandarin-speaking children aged 3 to 6

Research on speech acquisition and computational models of speech assessment of children requires large-scale annotated speech data. Reports of phonological development that are essential in the clinical domain of speech therapy rely on impressionistic judgments. At the same time, these judgments are indispensable training and testing materials for constructing machine learning models. This paper introduces the construction of a large corpus of 798 Taiwan Mandarin-speaking children ages 3 through 6. Details of phonological development in terms of words, syllables, tones, and segments, as well as results of a tone classifier and a phoneme prediction model, are reported and discussed. We hope to demonstrate that the enhancement of child speech technology needs interdisciplinary integration with domain knowledge of child speech acquisition and the associated data. Conversely, speech technology may also bring novel insights into linguistic issues that can only be tackled if the angle to examine the data is able to switch between expert observations and model predictions.

Keywords: impressionistic judgment, annotated child speech corpus, speech assessment, tone classifier, phoneme model

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